EDP industry report and market review

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Volume 7 — November 12, 1971 to November 6, 1972
Volume 8 — November 27, 1972 to October 11, 1973
Volume 9 — October 31, 1973 to September 11, 1974
Volume 10 — September 27, 1974 to August 19, 1975

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Issue No.	Date	Major Topic(s)
01	8/29/75	East-West Trade review; Advanced Memory Technology
02	9/15/75	IBM 5100; Telenet and Tymshare packet switching
03	9/25/75	IBM trial; new small systems; mid-decade; POS
04	10/8/75	Telex drops suit; IBM price changes; Univac 1100/10
05	10/24/75	European review; Honeywell Bull merger
06	11/8/75	Amdahl 470/V6; EDP spending potential
07	11/24/75	New minicomputers and OEM market; East German Ryad-40
08	12/8/75	Loyalty study
09	12/19/75	Burroughs 800 family; Japanese computer market
10	12/31/75	IBM satellite venture; 1976 spending
11	1/15/76	DECsystem 1080/ Singer out of POS; IBM small systems
12	1/30/76	Honeywell Level 6 minis; IBM VSPC; remote services
13	2/13/76	IBM at mid-decade; IBM Query By Example
14	2/27/76	IBM 370/168-3; data communications in 1975
15	3/12/76	IBM 3850; N.Y. Times Automated newsroom
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17	4/21/76	IBM trial review
18 & 19	4/30/76	REVIEW & FORECAST
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21	5/28/76	IBM cuts memory prices; AT&T vs FCC
22	6/16/76	NCC: Sperry Univac VS 90/80; miniperipherals
23	6/24/76	Distributed processing
24	7/22/76	IBM 370/138 and 370/148; Keydata service

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Dedicated application digital computers
As of 7/1/75 Issue 10
As of 1/1/76 Issue 18-19

General purpose computers
As of 7/1/75 Issue 5
As of 10/1/75 Issue 11
As of 1/1/76 Issue 18-19

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• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

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East-West trade review

U.S. COMPUTER TRADE WITH SOVIETS TAILS OFF AS FLAGGING COMECON PRODUCTION OPENS DOORS FOR WESTERN SUPPLIERS

Beginning next week, the USSR Chamber of Commerce will be hosting "Interorgtekhnika-75" -- the biggest Eastern Bloc data processing/automation trade show of the year -- and Soviet buyers are reputed to have more convertible currency allotted for this two-week event than for any other Soviet exhibition this year. Predictions have Westerners writing record orders for their equipment . . . and paying for the cost of it all with sales of the exhibit models themselves.

For this is the end of another "five-year plan" behind the iron curtain, and in the computer industry, at least, domestic production will fall far short of target. Consequently, the Soviets and other members of the Council of Mutual Economic Assistance (COMECON) -- including the USSR, Poland, Hungary, Bulgaria, East Germany, Rumania, and Czechoslovakia -- must look to the West to fill the gaps.

Trade shows like "Interorgtekhnika-75," though, are just part of a far larger phenomenon. The boom in East-West trade:

- Overall trade (exports and imports) between the COMECON countries and the industrial West topped over $47 billion in 1974, making it the first year Western exports have cracked the $20 billion mark. Total 1973 trade was almost 30% less at $33.5 billion.

- East-West trade accounted for a third of all COMECON trade last year. In 1970 it accounted for a fourth of $59 billion; in 1960 it was a fifth of $27.5 billion. The Soviet Union is the single largest trader in the East; West Germany leads the West -- at least statistically.

- Although current "five-year plans" in the COMECON countries typically program a 10% to 20% trade expansion rate for 1975, it's almost certain these limits will be exceeded . . . as the Soviet Union finds a windfall affluence in the fast-rising worldwide prices for oil and other raw materials of which it has an abundance.

- New payment conditions for internal COMECON trade -- calling for price changes to reflect worldwide inflation and certain payments to be made in hard currency -- should boost imports from the West.

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But for all the growth in East-West trade and ripeness of the Eastern European market, dealing with the Communist Bloc has its obstacles . . . especially for the U.S. computer industry. These include more than just simple red tape, customer education headaches, and lack of local market knowledge:

. . . U.S. export restrictions

Although COMECON nations are ravenous for high-technology products such as computers, various U.S. agencies -- citing national security -- are reluctant to serve up the most sophisticated U.S. fare. Ironically, it's not a lack of technical knowledge that causes COMECON countries so much grief; it's knowhow . . . an inability to translate knowledge into manufacturing, distribution, and marketing. Support and service are even worse. (Hence the Soviet penchant for importing whole manufacturing plants.)

Not until the recent Department of Commerce (DOC) approval for sale of an IBM 370/158 and a Univac 1106-II to the Soviets (EDP/IR, April 30 and June 19, 1975) did it appear that detente had seeped into the U.S. government's policy on computer exports. More recently, the DOC has okayed sales of 3330s. Previously, sales of anything more sophisticated or powerful than IBM 370/145s and IBM 2314s to the Communists were taboo.

Adding to American export woes is competition from other Western nations -- which aren't as fussy over licensing exports to Eastern Europe. American businessmen thus find that their homeland restrictions serve to dull any leading edge in technology they might have over their free world competitors.

. . . and the credit bottleneck

When Congress added amendments to the U.S. 1974 Trade Reform Act concerning Soviet emigration policy and Eximbank credit limits, the Soviets took it as a cold slap in the face. They renounced the 1972 bilateral trade accords, settled for denial of "Most Favored Nation" status as a U.S. trading partner . . . and cooled in their fervor to trade with the U.S.

But the real problem for American businessmen is that Eximbank credit limit . . . since the Soviet Union and allies customarily trade for credit rather than hard currency. Set at $300 million over the next four years, it's pitted against more than $9 billion that France, UK, West Germany, Japan, and Italy have granted the Soviets for use during the next "five-year plan." As for the U.S. commercial banks, according to Chase Manhattan Bank estimates they currently have only $500 to $700 million available for Soviet lending. So U.S. businessmen may find themselves strapped when trying to line up financing for East-West trade deals.

In a tacit comment on the credit squeeze, Soviet news agency TASS recently reported that the project won by IBM with its 370/158 had other U.S. bidders -- but they were rejected for "differences on commercial matters." The Soviet rhetoric probably means the deal was not totally a cash transaction . . . and how many computer firms other than IBM can afford to accept Soviet barter instead of cash?

Business barometers from DOC

That these obstacles pose real barriers to U.S. trade through the opening gaps in the iron curtain -- and that the computer industry is affected -- is borne out by U.S. Department of Commerce statistics:

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- Overall 1974 U.S. nonagricultural exports to COMECON countries grew by 57% to $581 million . . . but very little of that increase came from exports to Russia, the U.S.'s biggest customer. Discounting inflation from 1974 price hikes, real goods shipped probably dropped.

- In overall East-West trade -- including agriculture -- other Western nations posted substantial growth in 1974. The top four East-West traders, accounting for 53% of all East-West trade, upped their aggregate trade volume by over 80%. The U.S. dropped 37% (primarily because 1973 values were skewed by mammoth grain shipments).

- Reflecting the trend in overall East-West trade, shipments of computers and related products from the U.S. to COMECON countries rose about 40% for the first six months of 1975 over a similar period in 1974. Yet shipments to the USSR -- our biggest potential Eastern European market -- dropped (see chart below).

- In first half 1975, U.S. exports of computers and related products ran 5:1 in favor of non-USSR COMECON countries. Population and GNP, though, runs about 3:2 in favor of Russia over the rest.

- At the current rate, shipments of computers and related products to Eastern Bloc nations should grow about 40% this year, with relatively friendly Poland and Yugoslavia (not in COMECON) gaining most.

Caution: DOC export figures are for sales directly from the U.S. to other countries. Shipments from U.S.-based overseas subsidiaries do not show except in intracompany transfers from the States. Hence, U.S. goods could actually command a much greater market share than DOC statistics show; this could be an important part of the phenomenal growth rates of other Western countries in their East-West trade. In that respect, the U.S. might rank as the major trader with the East.

But even with those limitations, the DOC numbers depict a trend of lagging U.S.-Soviet computer trade . . . and show a U.S. trade with the Eastern European countries that is out of proportion with potential markets.

U.S. EXPORTS TO COMECON NATIONS: COMPUTERS AND RELATED EQUIPMENT

	Poland*	USSR	Czech	Rum*	Hung	Bulg	E.Germ	Total
First 1/2 1975 ($K)	$4,481	1,721	1,485	1,446	917	529	182	10,761
First 1/2 1974 ($K)	2,672	2,332	1,263	241	848	119	235	7,710
% Change	+68%	-26%	+18%	+500%	+8%	+345%	-23%	+40%

* Enjoy "Most Favored Nation (MFN) Status" with the U.S.

Note: Significant shipments were recorded to Yugoslavia, not a member of COMECON. First half 1975 U.S. exports there were $5.8M, up 36% from '74.

(Source: U.S. Department of Commerce)

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DATA PROCESSING IN EASTERN EUROPE AND USSR

Distribution of General-Purpose Computers, YE 1974, IDC Estimates

Origin of Mfgr	USSR #	USSR $M	E.Europe #	E.Europe $M	Total #	Total $M
United States	94	34	644	234	738	268
Other Western	115	40	956	333	1071	373
COMECON & Yug.	7791	2681	1150	396	8941	3077
Total	8000	2755	2750	963	10,750	3718

Computer Production - COMECON Countries

1973 #	1973 Rb (M)	1974 #	1974 Rb (M)	1975 #	1975 Rb (M)
1700	1350	2050	1760	2450	2170

Note: Production forecasts are IDC's best estimates from the limited information available, including rare figures released by Soviet news agency TASS and input from EDP East-West Report. Production estimates indicate that for computer products, the effective exchange rate is about 1/2 the "official USSR one.

Limping along with Ryad

Genesis of the Eastern Bloc hunger for Western high-technology products seems to lie in the nature of controlled economies. The business octopus required to design, build, and market computer systems seems better controlled by tight, autonomous Western companies than the rambling maze of bureaucracies charged with the task in the communist nations. And the ability to write generalized software for a new product is virtually nonexistent.

Once a computer is shipped, for instance, the manufacturing plant has no vested interest in making sure it gets installed right or even runs. And the user -- once he gets the computer -- must limp along on little more manufacturer-supplied software (instruction) support than U.S. pioneers had 20 years ago.

In other words, the end user takes a beating. Often it takes so long to install a system, that by the time it's up and running equipment failures have begun. Spare parts? "See another ministry, that's not handled here." Although information is scarce, it's rumored that 50% downtimes are not uncommon.

The Ryad family of computers -- COMECON's version of the IBM 360 -- is no exception. Spawned by the desire to unify the hodgepodge of incompatible computer models (often in ones and twos), the idea looked good on paper (EDP/IR, July 27, 1973). But in part because of nationalistic snags in intercompany development, Ryad production is running several years behind . . . and getting worse. In Czechoslovakia, for example, the main computer plant at Cakovice was scheduled to produce 20 R-21s (EC-1021). Instead, it came up with less than half that -- and production plans call for 90 more by 1977.

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MOST FAVORED NATION STATUS: NYET NECESSARY FOR THE REDS?

In the summer of 1972 President Nixon and Soviet chief Brezhnev initialled a bilateral trade agreement between the two superpowers which included provisions that the USSR would repay $722 million in back debts . . . and be granted "Most Favored Nation" trading status. Soviet goods could then enter the U.S. market under lower nondiscriminatory import tariffs. It also implied that the USSR would have freer access to low-interest credits via the Export-Import Bank.

Everything was fine and dandy -- the USSR made several installments on the $722 payback -- and the 1972 provisions were included in the omnibus 1974 Trade Reform Act. Then came the amendments. Congress gave the president the right to grant the Soviets temporary MFN status only if they relaxed their emigration policies. Congress also limited Eximbank credits to $300 million for 4 years. Angered, the Soviets denounced the 1974 act and renounced the 1972 accord.

But as far as trade goes, how much does the USSR really suffer by not being an MFN? The type of exports the Russians typically ship are raw materials, energy, and gold . . . generally duty-free anyway. Besides, Russia has ready markets closer at hand in Western Europe. Were MFN granted today, it's possible that the only imports to the U.S. to increase would be caviar and vodka. And as for credit, the Soviet Union has been slowly closing the gap on its export/import balance -- helped immensely by rocketing oil prices -- and probably pay cash for Western imports if it really had to . . . which it doesn't.

So the U.S. may have struck less than a blow for freedom. Soviet pride may have been damaged, but not likely its trade. To boot, American businessmen may now find their advances spurned . . . by a scorned Russia glad to deal instead with the French, the Germans, the Italians, the Japanese . . . .

Though much lip service has been paid to Ryad behind COMECON borders, there appears to be less to it than meets the eye. After six years, according to IDC sources in Europe, no more than perhaps 200 systems -- most of 360/20 and 360/40 size -- have been delivered to end users. And even that number may be high.

Of perhaps even greater significance is that after six years of supposedly "unifying" COMECON computer design and production -- much along the lines of Western Europe's Unidata -- each of the participating countries is still busily chugging away with its own separate and independent designs. Indeed, were the Ryad project an enterprise under capitalism, the dollars and sense of it might have long since tilled it under.

Passage to the bloc

Russia is the second biggest economy in the world. It has probably the single largest -- and mostly untapped -- supply of natural resources in the world and a population over 250 million. And yet, huge as it is, it's underdeveloped. For the computer industry, the Soviet Union and allies present an ideal combination . . . vast market, tremendous catch-up demand, focus on high-technology, and the wherewithal (much still underground) to eventually pay their bills.

But given the prevailing political climate and the nature of the two superpowers involved, American business may be handicapped in reaching for Eastern Bloc trade. Even companies like IBM -- almost a superpower in its own right -- might find the Russian Bear tough to skin.

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Bridging the memory access gap

INTEL INTRODUCES COMMERCIALLY AVAILABLE CCD DEVICE: THE IN-65 MEMORY SYSTEM; OTHER NEW MEMORY TECHNOLOGIES STRUGGLE TOWARD MARKETPLACE VIABILITY

For several years now, technical papers presented at NCC and other computer conventions have blithely predicted the closing of the memory gap -- that cost/performance chasm between core and semiconductor memories on one hand and disk and tape on the other -- through the use of new-technology memories. And they're bound to come . . . as various labs periodically announce breakthroughs in the study of such mysteries as magnetic bubbles, holographic images, electron beams and charge-coupled devices (CCDs). But the translation of that technology into practical memories remained around the corner.

Until now. Calling it the IN-65, Intel Corporation has introduced a commercially available CCD memory system that brings to market 1.1 million bits of memory with a worst-case latency time of 212 microseconds, maximum bit transfer rate of 14.4 megabytes/second, and a cost below .3¢ per bit. The system can be expanded by jockeying the component mixture or adding whole other systems.

In comparison, the new IBM 3350 moveable-head disk announced in July has an average latency time of 8400 microseconds, a data transfer rate of 1.2 megabytes/second . . . and a cost closer to .0012¢ per bit.

What is a CCD?

Developed at Bell Labs in 1969, CCDs are semiconductors that operate on a principle of generating and controlling the flow of discrete electrical charges . . . "packages" that can represent binary information as they are "dragged" by a clock along paths of electrodes deposited in the silicon chip. Like traditional MOS semiconductors, they are volatile in nature (data is lost when power is down). In addition, the charges (bits) also need refreshing at regular intervals to make up for dissipation that occurs as they move about. At room temperature, element storage time can last a second. Refresh in the IN-65 is 9 microseconds.

Because the charges representing information in the CCDs are constantly moving, they are not really individually addressable. As a result CCDs are block-oriented RAMs and configurations can vary in how data is read (serial, line addressable, etc.). In the IN-65 -- built around 16K bit CCD chips (the Intel 2316) read and write operations take place at a rate of 550 nanoseconds per bit.

Compared to rotating mass memories, CCDs offer advantages in fast access times and data transfer rates -- at costs per bit someday expected to be of the same order of magnitude as today's disks. Principle drawbacks to their usage is data volatility . . . and the vast amounts of money and software already committed to other forms of auxiliary storage.

Pitted against regular MOS semiconductor memory, CCDs are much slower . . . but they will eventually cost less per bit. And, because of high bit-packing densities, they cut down on the total number of devices wired in to an end product.

So far, the only other major contender besides Intel in the commercial application of CCDs to memory is Fairchild Camera and Instrument, which markets CCDs for solid state TV image sensors and announced a 9K memory chip last winter. Probably the first use of CCD memories will come from military applications.

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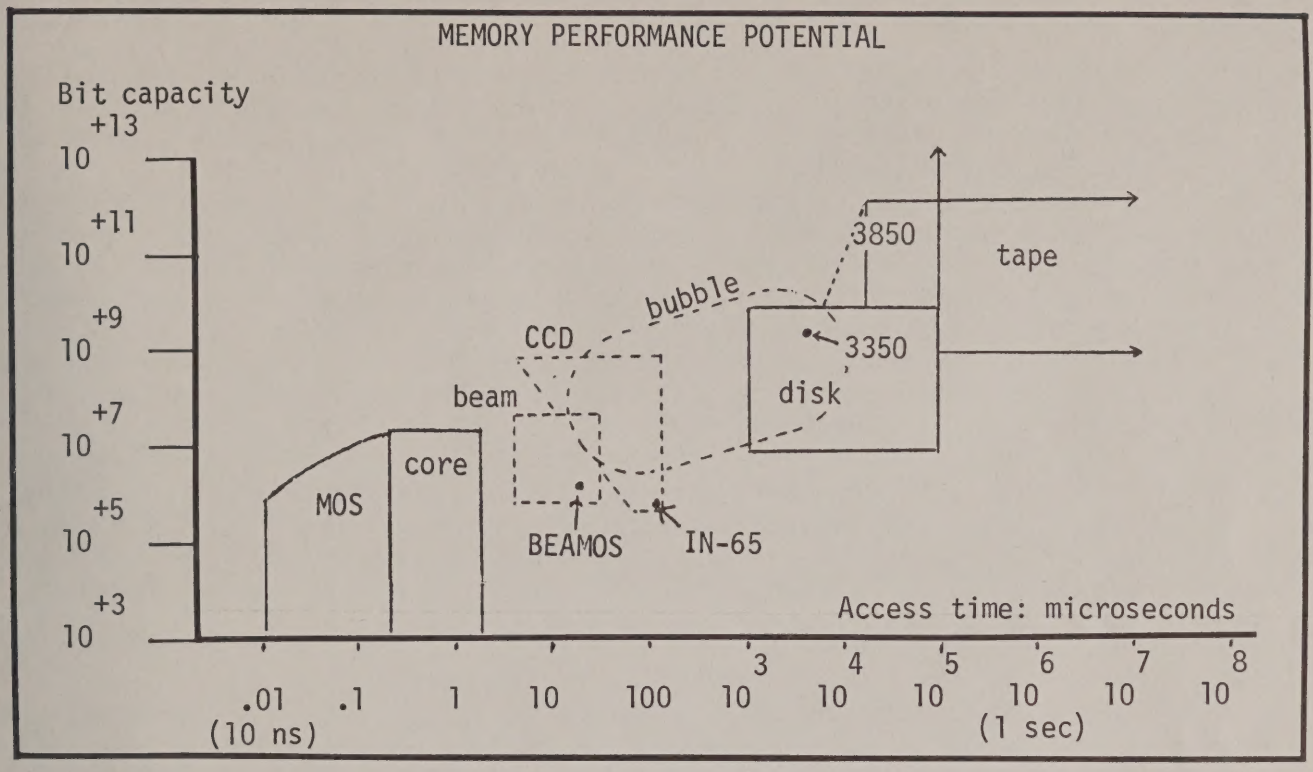

But charge-coupled devices are only one of several candidates to fill that memory access gap . . . and recently another technology has been in the news. Dubbed BEAMOS -- for Beam Addressed Metal Oxide Semiconductor -- a new 32 million bit memory system from General Electric was announced at this year's NCC.

In BEAMOS and in all known research into electron beam memories the data storage medium is the good old silicon chip (everything from thermoplastics to glass to thin film has been considered) . . . and read/write operations are done by the electron beam. Advantages to BEAMOS-type memories are high bit/chip densities, fast access times, and refresh intervals long enough for the memories to be considered nonvolatile. Signal decay in BEAMOS is 10% after 5 days with no power.

Initial applications of BEAMOS again will probably be military ones, but GE talks of eventual commercial use. For the current module, the system costs about .02¢ per bit . . . with expected improvement to the .001¢/bit range.

IBM: The bubble machine

Ultimately, the success of these emerging technologies -- and others like holographic and cryogenic methods -- may depend less on their inherent suitabilities as memory devices . . . than on the actions of IBM. For there's not likely to be room for all of them in the future of computer memories, and whichever gets the nod (and development bucks) from the Giant will have the best chance for commercial success. A case in point: MOS ascendance over thin film and plated wire.

And the technology that seems to have the Giant's current favor -- at least as a first-round replacement for rotating mass memory -- is that of the "magnetic bubble." Though IBM will certainly wait until it has fully worked its disk and tape base to introduce any new memory technology, the company has been heavily researching the nonvolatile devices . . . constantly driving performance up and the cost/bit down. It's a factor other memory makers will want to keep in mind.

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• HONEYWELL MAY HAVE HIT A CRIMP IN ITS MERGER WITH FRANCE'S CII, according to information from IDC's EDP Europa Report. Apparently the company of Thompson CSF -- a stockholder and minicomputer supplier of CII's -- has balked at some terms of the original Honeywell-Bull/CII merger plan (EDP/IR,May 12,1975). Crux of the problem is an alleged clause that gives control of the Bull/CII subsidiary to the partner with the greatest revenue -- regardless of shareholdings. Honeywell could thus dominate the company from its minority position. Thompson apparently feels its supplier relationship with Bull/CII might be jeopardized by American control . . . citing fears of future production and employment cutbacks. In fact, the whole fuss may be more a bid by Thompson to snare a bit of French government subsidy than real objection to the merger. Honeywell's comment on the matter was "no comment." So was Honeywell-Bull's.

Meanwhile, in an unrelated(?) discussion in a recent letter to shareholders, Honeywell CEO Edson Spencer told his readers: "I want to take this opportunity to assure you personally that there are no plans, strategies, or negotiations underway that would lead in any way to our leaving the computer business." Evidently, the recent Xerox cash-in had sparked just too much speculation about the company's future.

• TAKING PART OF THE SUM OF "TOTAL," CINCOM SYSTEMS, which developed and markets the popular data base management package, has come up with a subset for use on minicomputers. The first package will be for use on Varian's V-73. It will cost $10,000 -- a third of the price for full-blown "Total." Also available now from Cincom is a new version of Environ/1 for on-line control systems. Called "Entry Environ/1," it's designed for users getting into on-line systems for the first time. It will be available for as low as $275 a month, says Cincom.

• WELCOME TO THE MAILGRAM LUAU: Western Union International (WUI) has plans for a mailgram service between the U.S. and Hawaii. WUI's hope to install "Electropost" comes in the face of a recent ruling by the FCC that Western Union Corporation -- no relation to WUI -- could apply to extend it own mailgram service to the islands. WUI has proposed to the FCC "a unique 'trusteeship' arrangement, which would permit WUI's service to begin promptly, even while the legal and regulatory debates continue." Says WUI, a 60-word electropost message via teleprinter will cost $1.10 under its system, $1.65 under Western Union's.

• NOW THAT YOU MENTION ELECTRON BEAMS, Bell Labs has found another use for them: etching IC circuit master masks. Bell claims its process can write "sharper" masks than the normal photographic process because of certain wavelength properties of the electron beam. Circuit design is computer controlled.

• SOME RECENT MAINFRAME ACQUISTIONS OF NOTE: The Federal Home Loan Bank of Chicago is installing $3.3 million worth of Burroughs B 7700. The bank points to a rapid growth in services and the future reality of Electronic Funds Transfer as reason for the acquisition. The B 7700 will come in dual configuration. Elsewhere, in Dragnet country, otherwise known as Los Angelos, two new Sperry Univac 1110 multiprocessors will be installed at the county's welfare and general government computer centers. Also dual configured, the 1110s should be worth close to $14.5 million says Sperry. The 1110s sweat out a 12-month evaluation of bids from some 17 other computer and peripherals makers.

• ANYONE SEEN THAT LAST, ERRANT LITTLE DIGIT? It's the "0" we left off last week in reporting the number of NCR 399s in the U.S. Change that 500 to 5000.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" SEPTEMBER 15, 1975 • VOL.11,NO.2 P.J.McGOVERN,PUBLISHER

GSD's first consumer product

IBM INTRODUCES THE 5100 PORTABLE DESKTOP COMPUTER; TIMESHARING AND PROGRAMMABLE CALCULATOR MARKET TO BE IMPACTED

A year almost to the day after IBM's Data Processing Divison upstaged an INFO/74 Conference by introducing a new product and concept (Advanced Function for Terminals, 3770s, SNA, etc.), its General Systems Division took a turn. This time it was with a portable desktop (and takehome) computer, the IBM 5100 . . . weighing in at 50 lbs, carrying case available.

It's a humdinger. Though IBM is mass marketing the system to rope in first time users, the system could easily carve some business out of the timesharing industry . . . while turning the market for large, programmable calculators into a whole new ball of wax.

And in reaching out to all those "problem solvers" IBM sees tucked away in offices, labs, factories, schools and even data processing shops, the Giant threw in a few interesting new twists . . . such as:

- New marketing -- it's mail-inquiry, purchase-only this round, with no educational or quantity discounts. Customers uncrate and install their own computers, help with diagnostics for trouble-shooting.

- New technology -- the interactive high-level programming languages are firmwared into 48K-bit MOSFET chips, and the high frequency power supply is unusually small. Both are "state of the art," says IBM.

- New concept? -- while Wang and Hewlett-Packard programmable calculator markets may be simultaneously overrun and expanded by 5100s, new applications could have more one-way effects in areas like scientific timesharing or, to a lesser extent, programmable terminals and key-to-disks.

Prices for the IBM 5100 -- available next month -- start at $8975 and can triple with full 64K memory, peripherals and software. At first glance, the company's purchase-only policy is puzzling. But IBM probably has internal reasons (see box, page 2), and perhaps some marketplace rationale. If the 5100 market acts like the hand-held calculator market, price/performance swings would devastate a rental business. Besides, the paperwork on all those boxes out on rent might be more pain than it's worth . . . and portable goods are more prone to theft and accident.

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FRANK CARY LOOKS AHEAD: IBM ON IBM

Why the purchase-only policy for the IBM 5100? What's in store for small systems? Frank T. Cary, Chairman of the Board and CEO of IBM, made these comments during the question and answer period after a recent presentation to financial analysts in Chicago. The queries and his remarks are paraphrased below:

Q. What's the trend in current order levels in purchased systems?

A. While IBM overall orders have been up during the last trimester ending August 31, outright sales of computers and other equipment, which were lower in the first half of 1975 than 1974, will run behind 1974 levels for the year as a whole.

Q. What's IBM's future in "industrial minicomputers?"

A. IBM has trouble with the meaning of that particular term . . . but in the area of small systems, the company expects to have more entries in the future at that end of the spectrum. The establishment of GSD showed how important that end of the spectrum is considered. The company expects this part of the product line will play a very, very important part in our future growth.

Fifty pounds of 360/30?

Although comparing the two systems has its "apples to oranges" difficulties, the IBMers who demonstrated the 5100 to EDP/IR took pains to point out that when the 360/30 was introduced ten years ago with memory size comparable to the 5100 . . . it was many times the size, and rented for almost what the 5100 costs. But the 5100 is really a different beast. Its major features are:

- MOSFET memory expandable from 16K to 64K bytes, with 4K reserved for system control. Memory increments are in 16K blocks.
- Magnetic tape data cartridges for auxiliary memory, 206K bytes each. The read rate is 2,850 cps, write-with-checking is 950 cps. This is IBM's first use of such 3-M type cartridges.
- APL and BASIC programming languages -- 5100 models can come with either or both. The languages are interpretive, meaning there is no compiler.
- A 1024-character CRT screen. Characters can be either black on white or white on black, depending on operator preference, and may be spaced to 32 characters/line instead of 64 to facilitate reading.
- Optional 80 cps impact printer. The bidirectional IBM 5103, with 132 characters/line, can be disconnected when not in use. Price: $3,675.
- Optional auxiliary tape unit. Similar to the one that's standard in the 5100 console, the IBM 5106 allows for easier data or program copying. It's price: $2,300.
- CAI software support. To help users learn to program either BASIC or APL, computer-aided instruction is available on data cartridges for step-by-step learning. BASIC costs $225, APL costs $295.

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DR. AN WANG LOOKS UP: WANG ON IBM

Not everyone was thrilled by IBM's announcement. For Wang Labs, a small New England company that has been making highly-regarded programmable calculators for years, the fanfare sparked a quick retort in the form of a press release.

In it the company compared the 5100 with its own 2200 line, saying that "With the introduction of the model 5100, IBM, usually considered a market leader, has joined the numerous other computer manufacturers who display the 'me-too' approach to the desk-top computer market. Wang Labs is known and recognized as the leader in this marketplace, and has been delivering desk-top computers to customers in the technical field for over ten years."

The IBM 5100 falls short, says Wang, in its:

+ higher price
+ less available user memory
+ lack of full peripheral line
+ purchase-only policy
+ smaller applications library
+ slower communications rate
+ less readable CRT display
+ slower program throughput
+ less efficient use of memory

Dr. An Wang, founder and head of the company, made this outspoken remark: "I find it very interesting that IBM finally discovered that the desk-top computer is a good idea, as good, in fact, as the core memory idea that IBM bought from me 21 years ago. Only this time, they picked up the idea free, and implemented it through a somewhat inferior product."

- Problem solving library. For $500 each, three sets of problem solving routines in Math, Statistics, or Business are available under license agreement. The copyrited programs are nontransferable.

- TV monitor jack. Each model 5100 can output its CRT display to up to twelve closed circuit TVs for instructional purposes.

- Communications adapter. For communications to or from a mainframe, an optional feature allows for IBM 2741 simulation. It costs $900.

Model 5100: sex appeal

"Now you can have a computer right on your desk. Exactly where you need it. When you need it," touted IBM in its full page Wall Street Journal ad last week . . . and perhaps as much a part of the system's allure as any other single feature will be the idea of owning one's very own IBM computer. It's inexpensive enough a system to rack up at least some vanity sales.

But throw in some cost justification against existing problem-solving options -- such as interacting with an in-house computer that may have better uses for its time or paying to share time on a service bureau machine -- and the 5100 begins to look less like a toy. IBM itself admits that all the possible uses of the 5100 -- from straight high-power calculating to data entry to distributed processing -- haven't been catalogued. The fun of such discovery comes with the system gratis.

Add to the versatility, power, and plain sex appeal of the 5100 the security of IBM's reputation for service and support . . . and for Wang Labs and the others, being "me too"ed by the Giant may feel a lot like getting run over by a truck.

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THE IBM 5100 AND HARDWARE COMPETITORS

	IBM 5100	Hewlett-Packard 9830A	Wang 2200	DEC CMS/1;Classic	Datapoint 2200/1100
Memory (bytes)	16-64K	3-15K	4-32K	32-64K	4-16K
Peripherals	Tape cartridge Printer	Printer, plotter Paper tape Cassette	Cassette, floppy Paper tape, card Disk cart. Printer	Floppy, printer CRT copier	Cassette, card Disk cart. Printer
Languages	BASIC/APL*	BASIC*	BASIC*	FORTRAN, BASIC Assembler	DATABUS, BASIC RPG II, Assemb.
Communications Maximum rate (bps)	Asynch. 300 (IBM 2741)	Asynch./Synch. 9600	Asynch./Bisynch. 4800	none	Asynch./Synch. 9600
Price	$8975-$19,975	$6800-$19,875	$3900-$27,000	$7900-$18,000	$7200-$13,297

* Interpretive language - no compiler

Marketing the 5100

Both Wang and Hewlett-Packard salesmen questioned at INFO/75 last week emphasized that marketing high-end programmable calculators is different from pushing small general-purpose computers. Salesmen must be able to program in order to convince potential users that their applications can run on the gear, and "sometimes you've even gotta leave the thing overnight, and let the user play with it."

But IBM has another, less homey method: mass marketing. Not only will IBM ads soon be running in trade and technical journals . . . but members of scientific societies and other organizations will be receiving direct mail pitches. GSD tested the method on the System/32, and expects to use it more heavily for the 5100, although exactly what mailing lists the Giant will use is unknown.

Behind that is a new, dedicated sales force (estimated by a competitor at 135) culled from within IBM to handle follow-on demos and to close sales.

It's impact . . .

As the smoke from Wang would indicate, the 5100 ought to set fires in the market for programmable calculators. Wang says almost 6000 of its 2200 systems are installed worldwide by now, and sales of HP 9830s are estimated at past the 2000 mark. Those are the 5100's most head-on competitors. Assuming 5100s sell at least at the rate of S/32s, GSD could be deep into that market by Christmas.

Where will the users come from? IBM claims it's really out after the first-time user, the guy who has done without for so long. But these are the people who have either been doing things by hand -- in which case $10,000 is a lot to spend on a calculator -- or queuing up at service bureaus. Timesharing alone -- remote, interactive, raw power computer usage -- will bring in almost $500 million in service bureau revenue this year, twice that by 1979.

How much of that comes from 5100-type "problem-solving" applications is unknown, but a little arithmetic on CPU hookup and storage charges -- prorated over the life of a 5100 -- could be an argument for the 5100 if the applications fit.

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. . . and significance

"You know, I'll be as interested as you to see who buys these things," mused a GSD spokesman last week. Indeed, tracking the 5100 will be different, and IBM competitors may not feel its collective inroads. In addition to new and/or different technology (new CPU architecture for IBM, different storage medium, new technology for firmware implementation), the 5100 emphasizes IBM's move into a dispersed processing environment . . . and opens yet another base of users.

Furthermore, EDP/IR sees two other important implications of the 5100 . . . one about the nature of the product, one about the nature of its maker:

- It's an IBM product.
- It's a GSD product.

\+ + + +

Packet-switching update

TELENET HITS THE SWITCH ON WORLD'S FIRST COMMERCIAL PACKET NET

Packet-switching -- a data transmission technology brewed in the government's six-year old ARPANET -- took a quantum step forward last month when Telenet Communications Corporation filed commercial rates with the FCC and put its first customer on the line. The initial network spans seven cities, interconnected by high-speed lines leased from AT&T and other common carriers.

Charges for the switched, value-added service depend on data quantities, not transmission distances, and are 60¢ a kilopacket (1024 bits) plus varying amounts for the different access ports. Other transmission services -- such as Bell's Dataphone Digital Service (DDS) or Datran's Datadial -- charge by the mile.

The Telenet startup, in fact, is one more milestone in a telecommunications industry that has been hopping as of late:

- Packet Communications Inc., the first packet-switching company to be licensed as a communications common carrier by the FCC, has dropped out of the race. PCI was started by former employees of Bolt Beranek and Newman, the ARPANET contractor and Telenet's parent company.

- Bell Canada, which put North America's first digital telecommunications network on line with "Dataroute," has announced a packet-switching service called "Datapac" to begin next July. Several nodes are on trial already, finalized interface protocol will be issued next month.

- Pacific Telephone Company has won a bid from the state of California for a dedicated packet-switching network to begin operations about next March. AT&T's home office is admittedly watching the operation very closely. And in another area, industry sources say AT&T may bid on an upcoming AUTODIN upgrade planned by the DOD.

- An International Telecommunications Union (ITU) standards committee -- meeting in Geneva next month -- is expected to hammer out its final recommendation for interface protocols on switched networks. Such standards are a must for terminal makers -- at least non-IBMers -- in planning their telecommunications architecture for the future.

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What's at stake here is the big money in telecommunications. International Data Corporation figures on user spending indicate that communication line costs for U.S. EDP users will hit over $1.3 billion this year. By 1980, if present growth rates continue, that spending should reach $4 billion.

And by then, with satellite transmission technology past adolescence, software standards and network control systems up to par, and IBM's next round of computers on the block . . . the viability of communications networks, from that $4 billion point of view, may depend on their value-adding traits.

Telenet: first impressions

Scientific Time Sharing Corporation was Telenet's first customer, and its Director of Development, John Myrna, spoke at INFO/75. Although a cautious fan of Telenet's, he stressed that "we are not in love with any given piece of technology or any given piece of hardware." To offset the drawbacks of shared networks -- loss of development control, possible overbooking or vendor demise, data security -- he saw advantages beyond simple operating economies and better error rates:

+ Sharing a network -- and development costs -- could be cheaper than setting up one's own. Just listing communications gear as a company asset has drawbacks, considering the rate of technological change.

+ To expand an in-house network beyond its maximum capability can require massive capital for a relatively small increase in immediate operating performance. Not upgrading can cost in lost revenue.

+ A nonregulated network has the disadvantage of the vendor's ability to apply marketing pressure through pricing. Regulated data transmission outfits exist solely for the business of telecommunications.

+ Shared networks may be good backup systems for in-house nets where duplicate facilities would cost more than access charges and usage rates. Restoring or maintaining in-house networks to desired operating levels can take money and time better spent with a vendor.

+ Adding communications nodes in new cities (where the vendor is present) is cheaper with a shared system than with an in-house network.

As for the trade-offs between Telenet, Bell's DDS, and Datran's Datadial, Myrna proposed that they really depend on a particular user's data traffic patterns, reliability needs, and expansion plans.

Tymshare as a packet-switcher

Prior to Telenet's startup, the only other commercially available net using packet-switching was Tymshare's nonregulated TYMNET. When Telenet and the late PCI applied to the FCC for license to operate common carrier networks . . . the FCC gave them the go-ahead without ever stipulating whether the applications were necessary in the first place. The FCC is still studying the matter. Once a decision is made, possibly as early as this fall, the battle lines in the telecommunications war should become less ambiguous.

Until then, TYMNET competes with Telenet . . . but with older equipment and higher prices, says Myrna. But also with a proven system.

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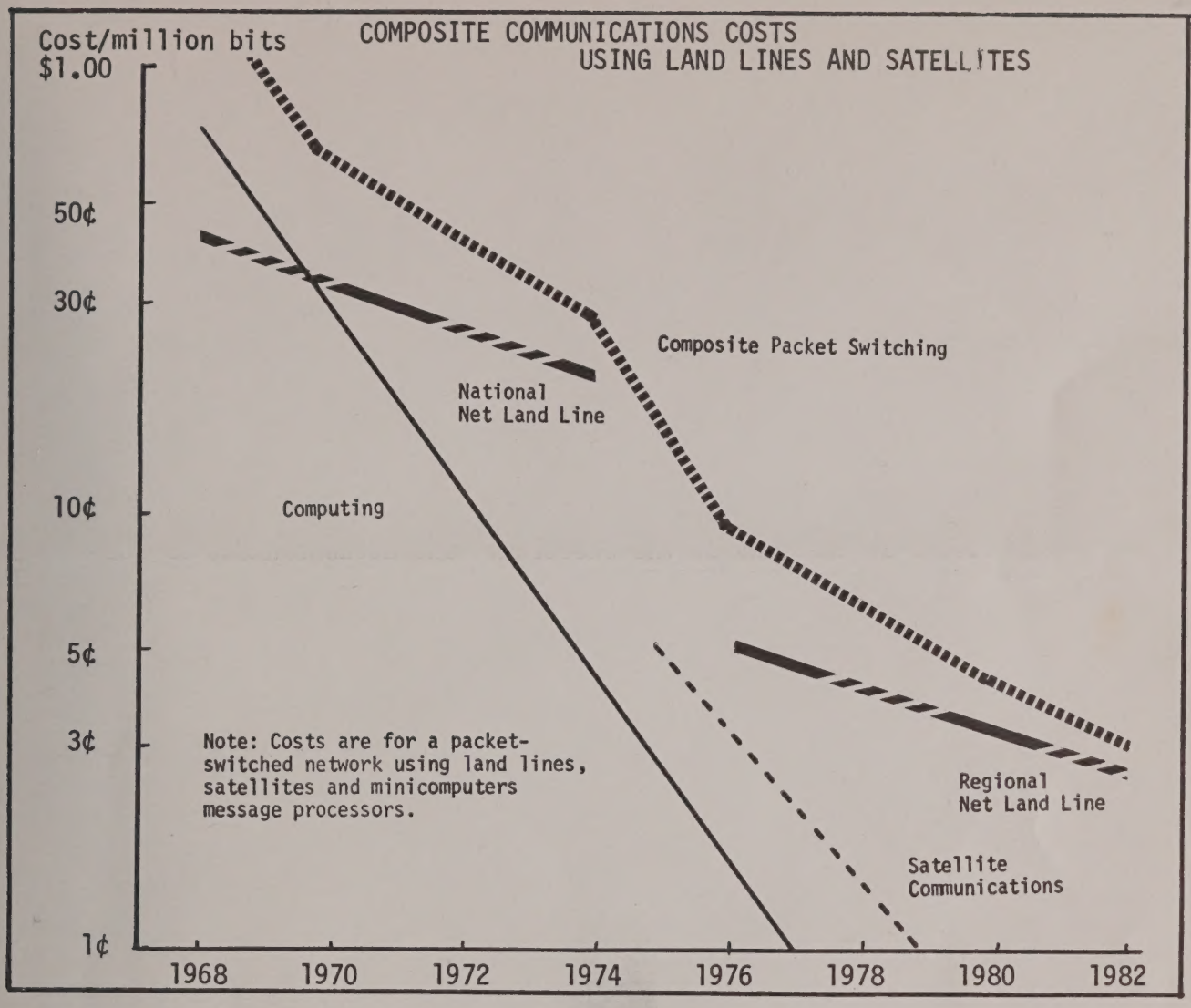

Beyond . . . to packet radio?

Conceivably, there's more to come. The chart above indicates both how and why packet-switched communications -- a hybrid based on technologies of both computing and data transmission -- becomes cost effective for more and more jobs.

But at the University of Hawaii, in a network that's been in operation since 1970 called ALOHANET, even more interesting technology is being sharpened. There, messages from the network's central computer are broadcast to remote nodes through a central radio transmitter dubbed "Menehune" . . . and receiving units, be they terminals, concentrators, minis, or whatnot, listen for signals addressed to them. Remote broadcast units enable the outlying nodes to answer back, repeaters keep signals in both directions up to strength. The system works something like a dispatch system for taxicabs.

Many parameters affect such a system's effectiveness -- number of listening nodes, retransmission methods, error and callback control, encryption protocol, and broadcast technology, for instance. But with companies like IBM getting into the satellite business, building microwave groundstations, and testing local line-of-sight transmission techniques . . . the post-Telenet generation of telecommunications may not be so far off.

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• SCOOPED BY THEIR OWN ADVERTISING DEPARTMENT, NCR had its plans for a new application for its Century 8200 system revealed: a turnkey package for hospitals. Though not officially announced, it's understood that the new system is designed for smaller hospitals -- 50 to 200 beds -- and will handle both patient and financial accounting. It will support up to seven terminals, two matrix printers, and a disk memory linked to the mini (NCR Model 605). As such, the system will compete with IBM's System/32 with the IAP for hospitals. Also in the medical area, NCR has announced MEDI-SCAN, a 399-based system dedicated to generating reports required by the government. The first software package, called the Utilization Review Module, is available for a $3000 license fee and a charge of 70¢ per each patient discharge. There's no price yet for the 8200 system.

Also out of Dayton is a new, data entry, microprocessor-based terminal family. The first model in the family -- the NCR 7200 Model I -- features visual display and is designed for off-line capture of data on magnetic tape cassettes. The cassettes can store 300,000 characters and are compatible with NCR accounting machines and Century computers. A base system goes for $5300 or $140/month on rent.

• FOR PEOPLE WHO WANT TO SPEAK SDLC, INTERDATA has introduced two new communications devices -- following up on pledges made when the Interdata 8/32 Megamini was announced (EDP/IR,March 13,1975). The single-board interface will be available late this year. One model will be able to link Interdata minis in bisynch mode, another will communicate in SDLC, HDLC and ADCCP (the latter protocols are ANSI and international standards). The bisynch unit will cost $1600, the SDLC interface will go for $2600.

• MEMOREX HAS A PROGRAMMABLE COMMUNICATIONS PROCESSOR NOW, called the 1380, and claims it now offers users "the most advanced and complete controller line of any independent in the industry." The 1380, as a functional replacement for the IBM 270X and 370X, can provide up to eight times the throughput of a 3705, says Memorex, with an aggregate data rate of 100KB per second. Also, the 1380 has enhancements like expandable MOS memory that are not available on the IBM controller. Prices run 10-15% below IBM's with the smallest configuration costing $1895/month on an extended two-year lease. A typical configuration for a large system -- with SDLC lines, CRT operator console, and 128K memory -- costs $4780 a month.

• DRESS UP A NAKED MILLE AND YOU GET? . . . Computer Automation's latest product, the Alpha LSI-3/05 Series. The Alphas add power supply, "motherboard," operator's console, and memory to the Milles, and are designed for use with off-the-shelf TTL components "for a broad range of low-end applications that need minicomputer capabilities at microcomputer prices." In quantities over 100, prices for the different models run from $701 to over $1000.

• FOR CDC THE ENERGY CRISIS HAS A BRIGHT SIDE, namely the shipment of two more Cyber computers to the Livermore Labs in California. Sent last month as one system, a CYBER 76 and a CYBER 70 Model 73 will aid in the establishment of a central site for computer activities related to the government's energy research. An $8 million contract was behind it all . . . and the system joins a heavy complement of CDC computers already on board, including: two recently installed STAR-100s, four CDC 7600s and one CDC 6600. Head of Livermore's computer center predicts that "by 1980, plasma physicists estimate that the need for theoretical studies (in energy research) will be so great as to require the equivalent of 20 CYBER 76 computers to carry out the job." That's a lot of mechanical brain.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" SEPTEMBER 25, 1975 • VOL.11,NO.3 P.J.McGOVERN,PUBLISHER

IBM, DOJ BACK IN COURT -- JUDGE EDELSTEIN URGES SPEED AS NEW PRODUCTS SPRING UP ELSEWHERE; EDP/IR TAKES A MID-DECADE LOOK

Far removed from the hustle and bustle of everyday events in computerdom, IBM and Department of Justice lawyers resumed their roles in a drama of much slower rhythm -- and greater gravity -- than others in the industry over which they debate. Outside the courtroom at Foley Square it was autumnal equinox . . . and as EDP/IR watched the sleepy proceedings inside, it was apparent that presiding Judge Edelstein was feeling the palpable press of time.

"I think we've got to move past the time where we engage in long and extended discussion and dialogue and argument about admissiblity," he prefaced, announcing a streamlined method for introducing documents into evidence.

And there may be some shortcuts. Besides the Judge's new ruling -- which puts off debate over document admissibility until all evidence is in, cutting down on courtroom debate -- both sides have almost agreed on how to stipulate the Telex record into evidence. Much from older cases has already been stipulated.

But, as this week's beginning testimony by James H. Binger, one-time Chief Executive of Honeywell, illustrates, examining and cross-examining witnesses is an incredibly slow process. And the list of those to testify is immense. The DOJ says it has a total of 100, counting the handful that have already testified . . . while IBM winks and mentions 800! Even if only a fraction are called, at one or two trial days apiece the lineup augurs ill for a speedy trial.

The case itself is still in the market-definition stage -- a crucial and painstaking groundwork phase -- and to an outside observer it appears a standoff. The DOJ calls one industry mogul after another to testify that his company's major competitors are mainframers . . . IBM counters with internal documents from the same companies that competitively analyze products from firms like Mohawk, Sycor, Decision Data, etc. But it's not outside observers that the lawyers must convince.

Indeed, the trial's pace is its most immediate characteristic -- the ingredient that causes lawyers' heads to nod and the judge to stifle yawns during the most massive antitrust case ever to hit the courts. One example of the mundane/exciting intermix that runs through this history-making trial was the discussion at last week's pretrial hearing. The topics? (1) The possible use of documents from Xerox concerning its decision to exit the industry, and (2) the trial's holiday schedule. Meanwhile, in other sectors of the computer industry . . . .

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RAYTHEON, NIXDORF, DECISION DATA ANNOUNCE SMALL SYSTEMS -- IBM ALTERNATIVES?

Small is big these days -- at least in the computer industry -- and that means almost daily assaults on IBM's massive base in small and/or distributed processing systems. And within the last month, three new competitors have joined the melee -- each from its own direction, each trading on its own strengths -- to take on the industry giant . . . or at least make a living in its vicinity.

Nixdorf Computer Inc., of German parentage, has begun U.S. marketing of the Nixdorf 8870. Though announced late last year in Europe, the American version comes with different hardware -- OEM from U.S. firms -- and new software designed specifically with the U.S. market in mind. Stressing its modular and turnkey approach, Nixdorf will be highlighting such major characteristics of the 8870 as:

- Core memory expandable from 48K to 64K bytes, and disk storage of one or two 10 MB Diablo disks. A variety of printers is available, including a German-made 165 cps matrix printer. The CPU is a Digital Computer Controls minicomputer.

- Business Basic programming language, a Nixdorf-enhanced version of the familiar BASIC. The language is designed primarily for interactive use from any one of up to nine CRTs supported by the 8870.

- Virtual memory, keystone of the 8870 operating system. The disk-resident OS can support simultaneous interactive timesharing and background processing . . . and adding CRTs does not require additional memory. Among other things, the OS provides terminal usage accounting.

- Customized software. To ready an 8870 for installation at a site, the "Nixdorf Systems Team" first analyzes the user's requirements then assembles packaged applications modules and tailors them to fit. Thus the system is customized . . . and the user doesn't need a programmer.

The system currently lacks communications, but the company says it's in the works . . . perhaps first between the 8870 and Nixdorf 820 and 840 terminal/computers, also sold in the U.S.

The price for a basic system consisting of one disk, a CPU, and a printer is $40,000 with leases available. The company, which sold $18 million of equipment here last year -- and increased its sales 45% during the first year after buying out its U.S. sales arm, Victor Comptometer -- hopes to sell $15-20 million worth of 8870s during its first year. Over 350 have already been booked in Europe.

Because of the 8870's interactive approach and multiterminal capability (versus, for instance, the single-CRT S/32) one salesman told EDP/IR that he foresaw his major competition coming from DEC or Hewlett-Packard systems cycled through systems houses, or the Singer System-10. But according to his U.S. home office it's the System/32 that will be the 8870's major foe. And how do you compete with an industry giant? "It's easy," said a spokesman. "We take a like product and make it turnkey. Customize it to the user -- not the other way around."

Raytheon Data Systems -- drawing upon its experience with the intelligent PTS-100 terminal series -- has announced a powerful mini-based distributed processing system, the PTS/1200 . . . which looks almost like a head-on attack on recently enhanced IBM 3790 Communications System.

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Besides providing direct IBM 3270 emulation, the system comes with up to 128K bytes of MOS memory, an RDS processor, and a maximum of 20 MB disk storage. Up to 24 operator stations can be hung off the system. The operating system, programming language, and certain Raytheon-supplied applications routines are all disk-resident . . . and compiling or validating programs is independet of any mainframe. Raytheon sees the display-oriented system as filling six major needs:

- Source data entry. The system can edit and validate, with keypunch or typewriter keyboards. Here the system may compete against the more traditional data entry products . . . or against high-end key-to-disks with communications.

- File maintenance -- including automatic format creation, file creation and information retrieval or updating. Both sequential and indexed file structures are available.

- Remote Batch operation. The PTS/1200 handles bisynchronous transmission up to 9600 bits/second and can operate unattended. It's also compatible with the IBM 2780 line discipline.

- Local report generation. Various printers may attach to the PTS/1200 with speeds up to 300 lines/minute. A card reader may also be attached.

- Standalone processing. With such peripherals and memory, the PTS/1200 can be used for local processing. According to Raytheon, the 110 statement programming language, Macrol, is exceptionally easy to use.

- Terminal emulation. In Raytheon's words, "Currently, PTS/1200 is a directly transparent replacement for IBM 3270 terminals; and as the IBM 3790 emerges as a product in wider use in distributed networks, Raytheon feels PTS/1200 can offer a direct alternative functionally, but at a substantially lower price."

A typical system with four CRTs, 64 KB of memory, a 100 cps serial printer, and 2.5 MB of disk storage would lease for $1,264 on a three-year lease or cost $43,100. Maintenance and software is included in the lease.

RDS is after big companies with dispersed DE needs -- like airlines, where the PTS-100 cut its teeth. IDC, publisher of EDP/IR, sees total growth of 3790-type systems -- whether clustered intelligent terminals or communicative key-to-disks -- as going from $32 million shipped last year, to $111 million this year, to $885 million in 1979 . . . fastest growing sector of data entry/communications.

Competition for the market will be intense, and IBM -- as the introduction of the 3760 Key-Entry System (EDP/IR,July7,1975) shows -- has signaled that it will be vying vigorously for its share, probably the lion's. But RDS with the $2 billion bulk of parent Raytheon to back it up, may have just joined the ranks of serious contenders for the rest.

And in a quirky turn of events that had Decision Data calling one press conference to explain why another was called off, the company revealed it is diversifying into the small business systems market -- with an entrant called the System/4. Said the company president, Loren Schultz, upon noting his company's growing line of peripherals for the IBM System/3 and other small systems: "If we analyze this, we have everything we need for a system except a processor."

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So, inserting an Intel 8080 chip into its product line and tying it all together with systems software and RPG II programming language, the company came up with a system . . . now being test-marketed in Philadelphia. Says the company:

- The 32K to 64K system will rent in the $500 to $1500 range, competing more with the IBM System/32 than System/3. Decision Data feels it has a bigger market in this area than in simple S/3 replacement.

- Strength of the system -- and still of the company -- will lie in peripherals. Decision Data feels that these days they are more important than a CPU to a small business system anyway. System/4 will have semiconductor memory -- as opposed to higher-priced core in IBM's System/3 -- and will use flexible diskettes as well as card I/O equipment.

- Industry application packages will also be part of the system, much like the S/32 IAPs. As the largest independent supplier of System/3 peripherals, Decision Data feels its industry-garnered expertise can be put to good use competing in this volatile market.

And, according to information published in Business Week -- neither confirmed nor denied by either company -- Decision Data may end up supplying the system to Univac on an OEM basis. If so, it takes on a little more clout . . . and IBM may find the market its S/3 and S/32 are making a household word more crowded than ever before. On its part, Decision Data may have been well advised to begin its migration from the more slow-moving, primarily card-oriented, S/3 marketplace.

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THE COMPUTER INDUSTRY AT MID-DECADE, OR . . . WHERE WE GO FROM HERE

In opening the Computer Industry Association's third annual board meeting earlier this month, EDP/IR editor James Peacock reviewed the quantitative outlook for the remainder of the decade. He pointed out:

+ There continues to be a basic user demand for information processing equipment and services. From less than $1 billion in 1958, user spending in the U.S. grew to $4 billion in 1963 . . . spurted to $12 billion by 1968 . . . edged up close to $20 billion in 1973 . . . and should top $25 billion this year.

+ Thus, revenues to U.S.-based companies in the industry are increasing at a 15% or better annual rate . . . still doubling every five years. This revenue growth is a little slower for some of the larger companies . . . much faster for many smaller ones.

Discussing the "numbers" associated with the future, he noted that we are entering the seven-digit realm in counting up certain computer industry products:

+ IDC's estimate of the number of computers built by U.S.-based companies and installed worldwide -- a number forecast to hit 886,000 for yearend 1979 at IDC's latest reckoning -- is certain to top the one million mark when the estimate for 1980 is published.

+ Already, in tallying terminals, like figures are necessary. The number of data entry/data communications keyboards in the U.S. will hit the 950,000 mark this year . . . and will top 1.5 million by yearend 1979.

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+ To the number of general-purpose terminals must also be added the one million-plus information appliances -- POS terminals, various bank terminals, stock market quotation/trading terminals, special ticketing or betting terminals, electronic funds transfer devices -- that IDC expects to be installed in the U.S. by decade's end.

More important, stated Peacock in wrapping up his remarks to the 40 or so industry chief executives, are the changes that lie ahead in the very nature of the industry. Technological factors close on the horizon will probably bring more change to the use of computers (and to the personal and business lives of most of of us) than they have in the past. Some of the things to look for, he said:

+ There is change ahead in how to define or describe a computer -- even in how you count them. System architecture will continue to digress from the classical mix of CPU, memory, control circuitry, and I/O. Essentially, the computer will become a network -- oriented around vast memory. And around that central memory, will hang both special- and general-purpose processors . . . system components. Much of the operating systems will lie in hardware . . . and data base management techniques will be key. In fact, computers may soon be networks of computers (perhaps in a single box), able to handle a number of jobs at once.

+ Despite the steady drop in hardware costs, there are strong indications that users -- especially the less sophisticated ones -- will have performance requirements that increase faster than prices drop. Thus IBM's 5100 (selling at almost what a 360/30 rented for ten years ago when it came out) could well have a successor that sells for slightly more (say $15-20,000) but that is a 158 in a briefcase.

+ There will be a gradual demise of the user programmer as we know him today . . . user's systems experts will be more like management specialists or information scientists. The good software people will migrate to service bureaus or hardware/firmware makers . . . and computers will be much more answer-oriented.

+ Acquisition of computers is gradually shifting from rent to purchase. Less than half (by value) the IBM 370s in the U.S. are owned by IBM. The figure is even lower for older gear and for other mainframers. As a result, 1) new technology is likely to find its way into product lines faster; 2) users may be given alternate upgrade paths, especially by IBM; and 3) total industry shipments will not have to be as great to sustain the same revenue growth.

+ Boundaries in the supply of computation or information processing are getting hazy. While service bureaus find themselves competing with small business computers, for instance . . . systems houses play both sides of the line . . . with applications emphasis. Smart terminals, information appliances, word processing, etc. bring more suppliers into the act . . . all offering alternative solutions.

+ The computer industry still needs maturity. Even in light of its nature, the industry is supersaturated with technologists . . . yet much of the excitement and promise of the information processing industry lies in its marketing . . . and more companies should devote more attention to this aspect of their product line and business operation.

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POS shakeout?

SUPERMARKET POS RUNS INTO HURDLES IN ECONOMY, CONSUMERISM, POLITICS AS INDUSTRY RETRENCHES . . . SETTLES IN FOR LONG-TERM, HEALTHY GROWTH

Shipments of supermarket point-of-sale terminals are expected to hit the 12,000-unit mark this year, bringing the installed base to 22,000 . . . and starting a deluge that should leave 335,000 units installed by the end of 1979. By that time, shipments will have slowed to the 40,000-unit annual level, with replacement activity predominating. The market is destined to grow as grocers overcome resistance to change and opt for the hard and soft cost savings POS allows.

But nowhere is the computer more visible in its effect on individual lifestyles than at the checkout counter . . . nowhere is an industry quite so subject to pressures outside its control. And as of late, those pressures have mounted to the point where the short-term picture seems cloudier than the long-term.

Two of the most recent examples of turbulence in supermarket POS are:

- MSI Data Corporation (Costa Mesa, CA) has dropped out of the race, citing "the extreme slowness" of the industry and fearing to commit "the considerable resources required to sustain MSI's position in the point-of-sale marketplace during the uncertain period ahead . . . ." MSI is not the first. Four years ago RCA dropped out of POS after pioneering a now-defunct optical standard (the bullseye) . . . and Pitney Bowes-Alpex took a multimillion dollar bath two years later when it retreated, only to find no buyers for its operation.

- Scanner production -- an indication of activity at the leading-edge of POS implementation -- is down, primarily because of order cuts on the part of NCR, the industry's leading scanner buyer and POS marketeer. The two NCR suppliers, Shiller Industries and Spectra Physics, blame cutbacks on the economy's adverse impact on grocers.

Why the sluggishness? When automation can lead to tangible savings -- even with item-pricing -- in more accurate checkout? The technology is here, but there are other factors at work:

+ *The economy.* Inflation and recession have combined to depress new store expansion . . . and simultaneous new POS implementation. NCR cites this as the major force slowing scanner installations.

+ *Consumerism/labor.* The question of item-pricing (see next page) has both consumers and labor unions worried . . . one group about ethics, the other about jobs.

+ *Fear of technology.* Implementing full-bore POS means change in business-as-usual, scary to both grocers and customers. The stores want quick return on their investments -- in understandable, "hard" savings -- and they want to keep their customers content.

+ *Legislation/politics.* As a result of the above, various legislative groups around the country (the latest being the U.S. Congress) are seeing bills introduced that restrict POS implementation, primarily in item-pricing.

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POINT-OF-SALE EQUIPMENT INSTALLED IN U.S. SUPERMARKETS -- MID-1975
(International Data Corporation Estimates -- Copyright 1975)

Supplier	Registers Installed	Percent Total
NCR	10,000	61%
Bunker Ramo	2,600	16
National Semiconductor	2,500	15
Sweda	600	4
IBM	400	2
Others	300	2
TOTAL	16,400	100%

Who's who in supermarket POS is shown above. Though late-comer IBM is down in the standings, as the computer industry giant, it will undoubtedly gain ground as time wears on. And buried in the "others" category are mainframer Univac and mini-maker Data General -- both likely to gain market share as they swing into full production. (Ironically, both of these companies' efforts spring from the ill-fated RCA venture.)

Scanners, UPC, and controversy

All of the major contenders in the market are testing Universal Price Code (UPC) scanners (or will be soon) . . . and their acceptance could be the rate-determining step in industry growth. At the moment hindrances to that acceptance is two-fold: (1) the UPC isn't fully implemented yet, cutting grocers' immediate savings, and (2) consumers are generally wary of any system grocers could jimmy.

To test consumer reaction to scanning with item prices removed, NCR recently conducted tests at its Marsh (Troy, OH) store installation . . . and the results on two of the questions are particularly interesting.

"At the end of the test, would you prefer that price marks be put back on the individual items or do you feel you can get along without them?"	Back on:	116	54%
	OK as is:	98	46%
"How do you feel about leaving prices off individual items if the store could demontrate tangible price savings for you because of not having to mark the individual items?"	OK with any saving:	31	27%
	OK w/some saving:	37	32%
	Only OK w/ big saving	19	16%
	NOT OK:	29	25%

What does it take to survive?

As the NCR test shows, there is some bedrock resistance to the most efficient use of scanning . . . and hence full-bore supermarket POS. Many of the companies involved think only four or five of their number will make it through the shake-out, pointing to MSI, Pitney Bowes-Alpex and RCA as examples. Others think the market is big enough for all.

"To survive," says Autotransaction Industry Report, another publication of IDC, "a POS manufacturer needs a lot of capital, strong technology, a large and well qualified service organization, an installed base is nice . . . but beyond that it takes stamina."

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• TELENET HAS ASKED THE FCC TO STIFLE TYMSHARE'S TYMNET, with a request that the agency order Tymshare to "cease and desist" further interstate communications services for hire. But whether the FCC will heed the request is another matter . . . primarily because the whole matter of value-added networks is currently under public inquiry (see EDP/IR, Sept. 15, 1975). Telenet complains that Tymshare's services -- which may have started with data processing roots -- are at this point in violation of the FCC rules under which Telenet must operate. And to a Telenet spokesman, it seemed that Tymshare "had reacted to Telenet" and become more aggressive. To Tymshare's president, Thomas O'Rourke, though, the Telenet move was seen more as a marketing ploy "to rattle some of our users." Arbiter of it all, the FCC, merely treated the Telenet request as an "informal complaint," and has given Tymshare two weeks to reply to Telenet's charges. Should Tymshare's answer not satisfy the commission, then Telenet would have the opportunity to lodge a more formal complaint. And when electronic mail comes along? . . . .

• WHITE KNIGHT TO CMC'S PROFIT WATCHERS MAY BE PERTEC . . . which has entered into a letter of intent to merge with the data entry outfit. Exchanged would be 1.8 million shares of Pertec stock for all outstanding CMC stock, depending on an audit of CMC's business, finance restructuring, and penning of a definitive agreement. Pertec sees its advantage in gaining a ready marketing force for new products under development now. Also, according to Pertec president Ryal Poppa, "combining Pertec's financial strength and manufacturing expertise with CMC's market base and existent lease portfolio will form a much stronger company than would exist should the two companies continue to operate as separate entities."

• ICL WILL FINALLY BE JOINING NCR AND CDC IN COMPUTER PERIPHERALS INC., following an agreement signed recently "to eventually acquire" a one-third shareholding of the hybrid company. CPI currently fills all of NCR and CDC's needs for card, tape, and printer equipment, say company spokesmen. Along with an initial purchase by the British firm of one-sixth interest in CPI -- for $8.6 million -- a subsidiary of the company will be established in the United Kingdom. It's all part of the changing European computer industry . . . which EDP/IR will be examining in greater depth in a future issue.

• HOMING IN MID-CENTURY, NCR has added some major hardware enhancements to its computer line. Multiprogramming, for example, has been added to the Century 101 and 151; the powerful NCR 658 disk is now available for the Century 151 and 201, with up to 200 million characters capacity; memory capacity has been increased on the Century 101 up to 128K of core; and new visual display consoles are available for the 151 and 101. In addition, rental prices for 48K and 64K Century 101s are being reduced from $65 to $70 a month.

• ANOTHER "SUPERMINI" WILL BE HITTING THE PAVEMENTS SOON, this one from Harris. To be called the Slash 7, it features core or semiconductor memory up to 256K words, a 24-bit data word, and memory interleaving and instruction prefetch to provide a 425 nanosecond cycle time. All Slash 4 and Slash 5 peripherals will be available, as well as high level languages Fortran IV, Cobol, Basic, RPG II and others. A minimum system (32K core) will cost $45,000.

• BURROUGHS ANNOUNCES THE AE 501 AUDIT ENTRY DATA PREPARATION SYSTEM for editing and validating data onto tape cassettes for batch transmission. It features a new 60 cps printer, has 16-32K bytes of memory, and can use all the standard line disciplines, including BDLC. A basic system will lease for $295 a month.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" OCTOBER 8, 1975 • VOL.11,NO.4 P.J.McGOVERN,PUBLISHER

Telex bails out

IBM, IN ACTIVE TWO WEEKS, WAIVES DAMAGE JUDGMENT AS TELEX DROPS ALL LITIGATION

> . . . technical attainments were not intended to be inhibited or penalized by a construction of section 2 of the Sherman Act to prohibit the adoption of legal and ordinary marketing methods already used by others in the market, or to prohibit price changes which are within the "reasonable" range, up or down. . . . [T]hese acts of IBM are . . . part of the competitive scene in this volatile business inhabited by aggressive, skillful businessmen seeking to market a product cheaper and better than that of their competitors. -- U.S. Court of Appeals, Tenth Circuit opinion handed down January 28, 1975

Once again, IBM's official portrait is that of a skillful businessman -- not a monopolist -- as Telex abandoned its antitrust case. On the last business day before the Supreme Court announced what cases it would hear this term, Telex withdrew its petition for review -- having gotten IBM's agreement to release the Tulsa company from the $18.5-million trade secret judgment handed down when the Appeals Court in Denver made the law that now holds.

The stakes were high. If the Supreme Court had elected not to hear the case, Telex would have owed the fine . . . which it couldn't pay. So it opted not to bet the company . . . even for the $260-million pot it had won temporarily in Tulsa, then lost in Denver. For its part, IBM made sure the terms of the settlement prevent Telex from reopening the claim or pursuing it abroad.

As a result, Wall Street breathed a sigh of relief this week, pushing the price of stocks in each company up. And although nothing much was stated, other antitrust plaintiffs against IBM, including the Department of Justice, must have felt a chilling wind at their flanks. For its part, IBM seemed to be quite spunky, taking action on several fronts. In just the last two weeks:

- IBM settled, for $800,000, the suit filed by Marshall Industries. So some observers expect a domino settlement theory with other cases -- Hudson General and Transamerica, at least -- not far behind.

- Selecting Aetna Life and Casualty as surprise partner, IBM and Comsat notified the FCC of plans to proceed under the "third party option" (EDP/IR,Feb.12,1975) for entering the domestic satellite business.

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IBM ANTITRUST LITIGATION CHRONOLOGY TO DATE

Plaintiff	Filed	Trial	Appeal	Concl*	$ Damages asked**	Dam./settle received
Control Data	12/68			1/73	3 x damages, estimated over $7B	$100M over 10 years SBC sold to for $16M
DPF&G	1/69			8/70	3 x $351.5M; $1B punative	Over $500,000 + better terms on debts to IBM
Department of Justice	1/69	5/75			(Divestiture)	
ADR/Programmatics	4/69			8/70	3 x $30lM; $3.5B rebates for customers	$1.4M and $600,000 of IBM business over 6 yrs
VIP	6/70			8/70	3 x damages (not estimated	$300,000 + write-off of $300,000 owed IBM
Greyhound	9/70	6/72 Dismissed	11/72 (pending)		3 x damages (not estimated)	
Telex	1/72	4/73 won	10/73 lost	10/75	3 x $361.3M (awarded $241M first round)	$18.5M counterclaim released by IBM
Levin	7/72				3 x unspec. damages	
CalComp	10/73	(11/76)			3 x estimated $100M	
Transamerica	12/73	(8/76)			3 x $50M	
Hudson General	12/73	(8/76)			3 x $28M or more	
Memorex	12/73	(3/77)			3 x $1.05B	
Marshall Industries	12/73			9/75	3 x $36M	$800,000
Forro Precision	8/74				3 x $12M	
DPF	9/74				3 x $15M	
Memory Technology	11/74				3 x $56M	
Sanders	1/75				3 x $85M	

* All cases concluded to date via settlement with IBM.
** Many suits also ask(ed) for divestiture and other relief. IBM counterclaim damages not included in $ calc.

- IBM raised most computer equipment prices by 4% -- excepting such gear as that recently announced or that included in the July "fire sale." Furthermore, labor intensive activities -- such as maintenance and services -- were increased by 8%.

Trimming for inflation

IBM's terse, September 30 announcement of a 4% price hike stated that "the price changes reflect the partial recovery of the generally increased cost of doing business." In other words, inflation. While the cost of producing hardware may be tempered by the steady drop in component costs, maintenance and services are not . . . hence the hefty 9% rise.

But IBM was selective in its changes -- tweaking here, trimming there -- and once more purchase-to-lease ratios changed for some equipment. In little more than a year, for instance, the ratio of purchase price to Monthly Availability Charge (MAC) -- or rental -- has dropped 25% for such equipment as the 370/115 and 125 CPUs . . . 20% for 3330s and 3340s.

Model by model details of the price changes are shown on page 3, along with information on how they affect the various IBM lease plans. An interesting sidelight of this information is the fact that apparently when IBM announced the Term Availability Plan (TAP) for System/32s last January 7 -- along with its clause giving IBM the option of raising prices up to 5% a year -- it also began inserting the same clause into regular Term Lease Plans (TLPs) . . . under which other mainframe equipment is leased.

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IBM EQUIPMENT PRICE CHANGES - 54 WEEK REVIEW

Model	9/17/74 MAC	9/17/74 Pur	1/7/75 Pur	9/30/75 MAC	9/30/75 Pur
CPUs					
115	+6%	0%	-15%	+4%	0%
125	6	0	-15	4	0
135	6	6	0	4	4
145	8	8	0	4	4
158	8	8	0	4	4
168	8	8	0	4	4
195	6	6	0	4	4
S/3-6	8	0	-15	4	0
S/3-8	NA		0	4	4
S/3-10	8	0	-15	4	0
S/3-12	NA		NA	0	0
S/3-15	8	0	0	4	4
S/7	6	0	0	4	0
S/32	NA		0	4	4
1130	0	0	*	4	0
1800	0	0	*	4	0
360/20	0	0	*	4	0
5100	NA		NA	0	0
3800	NA		0	0	0
3850	NA		0	4	4
Print					
3203	6	0	-10	4	0
3211	6	0	-10	4	0
1403	6	6	0	4	4
5203	6	0	-15	4	0
Maint/ Service		+8%			+9%

Model	9/17/74 MAC	9/17/74 Pur	1/7/75 Pur	9/30/75 MAC	9/30/75 Pur
Disk					
3330/40	+6%	0%	-10%	+4%	0%
3350/44	NA		NA	0	0
2311/12	6	6	0	4	4
2313/14	6	6	0	4	4
2319	6	0	-10	0	0
2302	6	6	0	4	4
2305	6	0	-10	4	0
Comm					
3704/5	6	0	-15	4	0
2701	6	0	-15	4	0
2703	6	6	0	0	4
Tape					
2401/20	6	6	0	4	4
3410/20	6	0	-10	4	0
Card					
2520/40 60	6	6	0	4	4
Term					
2741/40	6	0	-15	4	0
3270	6	0	-15	4	0
3600/50 60	6	6	0	0	0
3740	6	0	0	4	4
3760	NA		NA	0	0
2260	6	0	0	4	4

* Purchase prices cut 20-40% on 2/1/75.

1. Purchase price hikes go into effect immediately (September 30, 1975), MAC rental hikes become effective January 1, 1976.

2. FTP and ETP contracts going into effect prior to September 30, 1975 are unaffected. Those in effect afterwards will be at the new prices as of 1/1/76.

3. TLP (Term Lease Plan) contracts in effect before January 7, 1975 [System/32 announcement date, TAP announcement date] are unaffected by the price hikes. Those going into effect after then are affected . . . but not before the one year anniversary of commencement or 1/1/76, whichever comes first.

4. TAP (System/32 and System/3) contracts are affected but not before the one year anniversary of commencement or 1/1/76, whichever comes first.

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For IBM-watchers who see trends in the purchase-to-lease ratios and the 370 series lifecycle, production status of the 370 CPUs is shown below. Equipment in "Limited New Production" may have recycled components in it when shipped . . . that "Not in New Production" will be entirely recycled gear. The categories are useful for tax purposes -- and as an indication of IBM's manufacturing stance -- but it's all warranteed by IBM as new. Of System/3s, only the Models 12 and 15 are in "New Production." The 370s:

Model	Status	As of	Model	Status	As of
3115	Lim New Prod	7/28/75	3158	Not In New Prod	3/26/75
3125	"	11/8/74	3168	"	3/26/75
3135	"	3/18/74	3158-3	New Prod	3/26/75
3145(ISC)	"	3/26/73	3168-3	"	3/26/75
3145(IFA)	Not In New Prod	3/26/73			

Owning a piece of the rocket

Four days before the price hikes were announced and three days before the Marshall settlement, IBM and Comsat General calmly wrote the FCC that they had at last found a suitable third partner to join with them in ownership of CML Satellite Company: Aetna Casualty and Surety Company, a subsidiary of Aetna Life.

The three companies are to become equal partners in CML -- in investment but not necessarily stock holdings -- and thus comply with the FCC order set forth on February 10, 1975, which prevents any one partner from having a majority interest in the joint venture.

Subject to FCC approval of CML's application for a satellite system:

- IBM will buy and Comsat General sell stock until each owns 42 1/2%; Aetna will buy 15%.
- Aetna will purchase from CML (the joint subsidiary) a convertible note to bring its investment equal to that of IBM and Comsat General.
- Each partner will invest up to $55 million. Beyond that the subsidiary will obtain funding from outside interests.

Why Aetna? A spokesman for the company explained that although talks with IBM began almost by chance last June, soon the company saw a deal with IBM and Comsat General as an opportunity to take part in a high growth industry (in a company almost preordained to be successful?).

As for IBM and Comsat General, they not only get to satisfy the FCC requirements and stand a chance of forging ahead with their satellite plans . . . but they also get Aetna's financial expertise and hefty bucks. The idea of having a user as third partner is interesting, at least.

Exactly when CML will submit a system plan to FCC -- and presumably touch off another round of protests like those when IBM bought in -- none of the companies is saying. But CML has been on the Comsat General and/or IBM payroll for over a year -- with task forces studying technology and marketing aspects of satellite communications -- so it should be soon. Or as one spokesman jokingly put it, "as soon as the [expletive deleted] lawyers write it up."

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Multiprocessing for the masses

UNIVAC EXTENDS ITS 1100 FAMILY DOWNWARD WITH 1100/10 AS 1106 REPLACEMENT STRESSES GROWTH PATH FOR MEDIUM-SCALE USERS, DEBUTS NEW BENCHMARKING FACILITY

In a combination press conference and dress rehearsal for the next day's Board of Directors meeting, Sperry Univac last week announced and demonstrated the latest in its growing family of medium- and large-scale 1100 series computers. And with the 1100/10, as it is called, comes another sign of that sporadic vigor that keeps Univac chugging along as the number two mainframer . . . and observers wondering things like (1) Where is all that fourth generation stuff Univac speakers predict at forums like Info/75 and NCC? (2) Is there a revolution hidden in here somewhere? and, (3) When will the RCA/Univac product line actually converge?

But such macro considerations aside, the company -- building on computer and software revenues reported for the fiscal year ending March 31 of $1.29 billion and results for the latest two quarters up 10% from the year before -- thinks it has something unique in the 1100/10. And that something unique, says the company, is a price tag that drops the 1100/10 into the medium-scale marketplace . . . to triple the number of potential 1100 users.

If the company's performance specs are to be believed, the 1100/10 -- which uses new 4K semiconductor memory chips and supports all the peripherals and software available on the bigger 1100/20 and 1100/40 (EDP/IR,March 26,1975) -- stacks up well against its compadres. According to the company:

- In Thousands of Operations/Second (KOPS) per $1000 of purchase price, a 131K 1110/10 (CPU group only) has twice the price/performance of an IBM 370/145 . . . 1.3 times that of a Burroughs B6748, and 1.7 times an HIS 66/20. Ratios get even higher as memory is increased.

- For multiprocessor systems, the Univac price/performance ratio is almost twice that for the nearest Burroughs, HIS, or IBM model . . . with a purchase price of less than $1.3 million. An IBM 370/158 MP costs over $4 million, not counting the latest price increase.

- 1100/10s can be field upgraded to 1100/20s -- giving the potential user less conversion hassle than say, switching from a 370/145 to 158, where mainframes actually change place.

- Monthly rental prices for the 1100/10 on a one-year contract run from $20,000 to $55,000 (including maintenance) or cost between $800,000 and $2 million. Univac offers 1- and 5-year protected leases on all its 1100 computers . . . attractive in these inflation-plagued times.

In essence, Univac claims the 1100/10 offers competitive advantages in price/performance, peripherals selectibility, convenient growth into larger systems, and lower-priced entry into multiprocessing.

Univac also claims its bundled pricing is an advantage. "We'll just send out one operating system tape to all 1100 users," said a spokesman. "They feed in the parameters based on their specific configuration, and that's it. One tape." For Univac, the 1100/10 is one way of stretching those development bucks spent on the larger systems . . . while wedging into new and bigger markets . . . markets perhaps more ready for change.

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UNIVAC MEETS THE PRESS

Besides "no comment," "definitely yes," and "definitely no," Univac spokesmen at the 1100/10 unveiling answered a few questions concerning Univac in general. The responses went something like this:

. . . Yes, the company is still mulling over the pros and cons of taking over the Xerox base, and it's about equally divided now, negative and positive. A gambler's instinct might shade it more on the negative side. [See page 8!]

. . . Yes, we are continuing to enhance the Series 90 line as well, and we don't think the 1100s will much impact that base, except for customers wanting to change styles of data processing. And in that case we offer them an attractive product. Eventually the two lines will converge.

. . . No, we do not currently offer a communications protocol equivalent to SDLC or BDLC. But we are working on it, in conjunction with various standards committees, of course, and will have more to say about this in the future.

. . . Unlike Xerox, we feel that we have or will have the capital (and commitment) to continue through the next generation of computers. Also unlike Xerox, RCA and GE, making computers is the major part of our business -- and we think that makes a big difference.

. . . No, we don't see ourselves getting into the satellite business, partly because of capital constraints. And frankly, the idea of IBM locking users into total teleprocessing systems is a little frightening. Yes, it did seem a little odd for them to choose Aetna as a third partner.

. . . Siemens breakup of Unidata? Well, perhaps it helps the chance of a joint venture since the company is no longer wedded to Unidata -- but everybody seems to be waiting to see what happens with Honeywell Bull and CII.

The 1100/10 itself comes with the following:

- Main memory of 131K 45-bit words, expandable in 131K increments to a maximum of 524K. Cycle time is 1.125 microseconds (the 1100/20 has a cycle time of 875 nanoseconds); execution time is 1.468 microseconds.

- Four integrated IO channels expandable to 16.

- As mentioned, all peripheral and software options also available on the 1100/20 and 1100/40. In addition, a new low-cost tape system, the Uniservo 14, was introduced with tape speed of 60 inches per second and transfer rate of 96 KB/second.

- Either unit or dual processor configurations. Memory can be configured for single path or dual path addressing or both, depending on the number of 131K modules.

Marketing the 1100 family

The 1100/10 joins a family which Univac claims includes 800 systems installed worldwide -- worth $2.5 billion -- and a shipment rate over 200 systems per year. Fifteen percent of the 1100 base lies in the manufacturing sector, mostly with

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smaller systems. The next biggest sectors are in energy, education and government -- each with 11-12% of the Univac 1100 base.

By application, over half of Univac's 1100 series are used for business data processing only, a third are used for scientific applications only, and the rest are used for both or are "special" systems. Over half of the 1100s currently installed are used in real-time and/or demand processing applications at least some of the time . . . and the company says the ratio of on-line to batch usage of its systems has increased markedly over the last several years.

Next generation benchmarking?

Debuted along with the 1100/10 in St. Paul was the Eagan Benchmark Facility in Univac Park, the showcase complex that houses the company's Defense Systems Division and Customer Support Services Americas Division.

Within the facility, the company has put together an automated benchmarking system that provides real-time display of system performance for potential customers on tests on systems configured to their specifications. All information transmitted during the benchmark tests is recorded on magnetic tape for "instant replay" in different time modes and with different examination parameters. Hard-copy printout of the tape is provided at the end of the benchmark for customers to take home with them. The monitoring system has three parts:

- A data monitor module. This collects information from hundreds of hardware probes on the system and transmits it at one second intervals to the benchmarking system.

- A control system. Based on a Univac 1616 minicomputer, this provides the controlling functions for data communications and operation of the benchmarking display system.

- The BMD-1100 Display. Here is where the potential user can witness host system operation. It includes a digital counter of the jobs and their status going on in the host; a color video screen that shows system operation over time under a variety of parameters; and a configuration display showing system and peripheral alignment and utilization.

The problem with benchmarking in the past, says the company, has been that it is normally done by harware monitoring (passive, no picture of program efficiency) or software routines (active, measurement can affect results). Univac feels it's wed the best of both methods to provide a sophisticated and thorough look at a systems insides . . . placing special emphasis on that real-time video display.

Univac admits that developing the system was expensive, the display unit alone costing perhaps half a million, but feels that some of the expense will be recouped in smaller proposal costs. More, Univac thinks it will help it sell computers.

And interestingly, when EDP/IR contacted IBM and Burroughs to see if they have comparable setups for benchmarking (they don't), it was this facility more than the announcement of a new computer model that stirred the most interest. And while both competitors provide operating system software for monitoring system resources . . . it's not the same as showing a potential user exactly what he'll be getting, exactly how a certain system configuration will handle his applications programs. And certainly not in color.

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• CHUBB & SON, INC, HAS CUT THE RIBBON ON IBM'S FIRST 3790 IN THE U.S. -- paving the way for IBM's thrust into distributed processing. The communications system -- installed at the insurance company's home office in New Jersey -- with 3277 Mod 2 CRTs, and 3793 keyboard printers for input/output and connected to the company's 370/168. Communications controllers will eventually be lodged in 33 other branch offices as well, said the company, with varying numbers of terminals and displays attached depending on branch office needs.

• ME TOO, SAID HONEYWELL ABOUT CONSIDERING A XEROX BUY after news surfaced that Sperry Univac was mulling the possibility over. But, aha, Univac last week admitted that it has ceased negotiations (couldn't come to terms), leaving Honeywell to shop alone (for a user base, not a product line says HIS).

Meanwhile, in a possibly related event, Tymshare and Quelex Data Systems (Northridge, CA) have announced agreement in principle for Quelex to become part of Tymshare's subsidiary, Valcomp. Tymshare will initially pay $1.5 million for Quelex -- more later depending on how the Valcomp-Quelex division performs. Both Valcomp and Quelex are specialists in the support and service of Xerox equipment. And thus the timesharing house -- a big Xerox customer -- hopes to put the XDS abdication to some use.

• FLOPPY DISK AFFICIANADOS TAKE NOTE: Control Data is now offering a double-density flexible disk drive -- the CDC 9404 -- with a 6.4 Megabit capacity to OEM customers. In OEM quantities, the unit price of the disks will be $450 to $500. Up to four of the drives, says the company, can be interfaced in a "daisy-chain" configuration -- cutting power and cooling requirements. The system will be available starting this month.

But Rockwell International thinks users may see even more cost/performance changes in the future -- especially if system designers use its new LSI floppy disk controller I/O circuit on its PPS-8 microprocessor. Costs on IBM-compatible disk controllers could be cut as much as 80% that way, says the company (and Rockwell microprocessor sales enhanced).

• ISN'T THERE ALWAYS A FLURRY OF ACTIVITY IN AUTOTRANSACTION? Most recently, NCR has landed a $2 million sale of POS equipment with an Ohio food chain, Wendy's International; announced a new on-line bank information system for inquiry and update with its Central Information File system for commercial banks; and been chosen as the supplier in a 17-bank EFTS network in Iowa (Brenton Banks, Inc.) The latter system will operate 24 hours a day on-line.

Burroughs, though, has been active too . . . with the introduction of a low-cost transaction control terminal system, the TT 602. The terminal system -- designed, says Burroughs, primarily for EFTS application -- consists of two modules that can be up to eight feet apart. The keyboard/display is housed in one . . . memory, logic, etc. in the other. Purchase prices for the micro-based unit start at $990.

Finally, National Data Corp. found itself just under the wire in its recently announced credit card authorization services contract with the W.T. Grant Company. Worth half a million/year (or much more), according to an NDC spokesman, the services contract went into effect just prior to Grant's Chapter XI filing yesterday. Though Grant will have to default on obl-gations occurred before the filing, supposedly it will be able to pay its bills from then on. So NDC is continuing the service -- perhaps the largest credit authorization service to a third party ever let, and certainly NDC's biggest -- and says it is not worried.

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"THE GRAY SHEET" OCTOBER 24, 1975 • VOL.11,NO.5 P.J.McGOVERN,PUBLISHER

European review

EUROPEAN DP MARKETS HIT BY RECESSION; VENDORS VIE FOR MARKET SHARE; PHILIPS BOLTS UNIDATA . . . AS CII-HONEYWELL BULL MERGER NEARS

While the likes of IBM, Xerox, and the United States legal system have been keeping the U.S. newsdesks bristling with copy these past weeks, computer happenings in other parts of the world have been no less hectic. And in Europe -- pretty much an IBM province when it comes to computers -- it's been lesser mainframer Honeywell scooping most of the headlines.

The hubbub stems from the CII-Honeywell Bull merger, apparently in its final stages: Philips, the Netherlands mainframer, cites it as reason for abandoning Unidata . . . the French government plans to restructure its minicomputer industry around it . . . and U.S. mainframers may be looking to follow suit, in hopes of challenging IBM market power and sidestepping European nationalism. In the meantime -- while the marketplace sorts itself out -- European users must try to plan for a future full of "ifs."

And beyond the uncertainty of such topical problems as who sells what to whom lies an even deeper worry for the overseas DP user . . . the economy.

International Data Corporation, publisher of EDP/IR, in recent interviews with some of the largest French and West German corporations -- which spend about two fifths of the computer dollars in those countries -- found recession/inflation was having significant effects on their budgets. And those effects are translating into both opportunities and headaches for suppliers. Among the findings:

- High interest rates, in part spurred by balance of trade woes, have curtailed general corporate investment . . . leading users to postpone system buys and place their expansion plans on ice for a while.

- Many of the big companies are retrenching, gearing for an uncertain economy. Often this means consolidation of operations and decision-making at central sites . . . with the attendant influence on the nature of computer equipment and services needed.

- DP managers are stretching their dollars . . . with comparison shopping, tighter and better utilization of resources, and enhancement of systems through add-ons and peripherals.

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ESTIMATED WORLDWIDE INSTALLATIONS OF GENERAL-PURPOSE AND DEDICATED APPLICATION COMPUTERS YEAREND 1974
COMPARISON OF COMPUTERS IN USE TO GNP AND POPULATION OF EUROPEAN NATIONS
(Copyright 1975 by International Data Corporation)

Country	No. CPU	% Total	$M Value	% Total	Cum. % By $M	$B GNP (1974)	%-EDP/ GNP	$K GNP/ Capita	Population (1974-Mil.)	No. CPU/ M.People
USA	165,040	57.5%	33,600	55.1	55.1	1,428	2.35	6.685	213.6	773
Canada	6,158	2.1	1,589	2.6	57.7	144	1.10	6.545	22.0	280
N.A. subtot.	171,198	59.6	35,189	57.7	-	1,572	2.23	6.672	235.6	727
West Germany	18,843	6.6	4,746	7.8	65.5	374	1.26	5.965	62.7	301
U.K.	14,424	5.0	3,685	6.0	71.5	173	2.16	3.073	56.3	257
France	16,107	5.6	3,235	5.3	76.8	283	1.14	5.370	52.7	306
Italy	7,675	2.7	1,694	2.8	79.6	167	1.01	3.020	55.3	139
Scandinavia	5,245	1.8	1,396	2.3	81.9	108	1.29	4.887	22.1	237
Benelux	5,333	1.9	1,342	2.2	84.1	121	1.10	4.879	24.8	215
Switzerland	2,975	1.0	728	1.2	85.3	55	1.32	8.088	6.8	438
Spain	2,050	0.7	525	0.9	86.2	75	.70	2.131	35.2	58
Austria	1,336	0.5	303	0.5	86.7	33	.91	4.423	7.5	179
Other W. Europe	782	0.3	148	0.2	86.9	17	.87	.791	21.5	36
Subt. W. Eur.	74,770	26.1	17,802	29.2	-	1,406	1.26	4.076	344.9	217
Japan	26,069	9.1	5,917	9.7	96.6	447	1.32	4.082	109.5	238
Other West	14,891	5.2	2,103	3.4	100.0	210	1.00	.310	678.2	22
TOTAL	286,928		61,011			3,635	1.91	2.661	1,365.8	210

Note: GNP figures are in current dollars at 1974 exchange rates. Sources for the numbers include various U.S. government and OECD publication . . . and values are best considered educated estimates.

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- User spending increases -- even in West Germany, where inflation has been held to 6% -- will be largely channeled into higher wages and salaries. Ironically, rising personnel costs are seen as a major impetus toward automation . . . and growth of data processing markets.

As a result, U.S. exports to EEC nations of computers and related products -- which the U.S. Department of Commerce says reached $510 million during the first half of 1975 -- will show most growth in areas other than mainframes . . . floppy disks, terminals, key-to-disks, minicomputers, small business computers, etc.

(This trend is seen, for instance, in figures released in this year's Review and Forecast issue . . . where 1975 growth of computer shipments from U.S. manufacturers to overseas markets is flat . . . and only minicomputer shipments keep the total from registering a slight decline. By 1980 then, minis will account for 15% of the value of all computers shipped overseas -- twice 1974's percentage.)

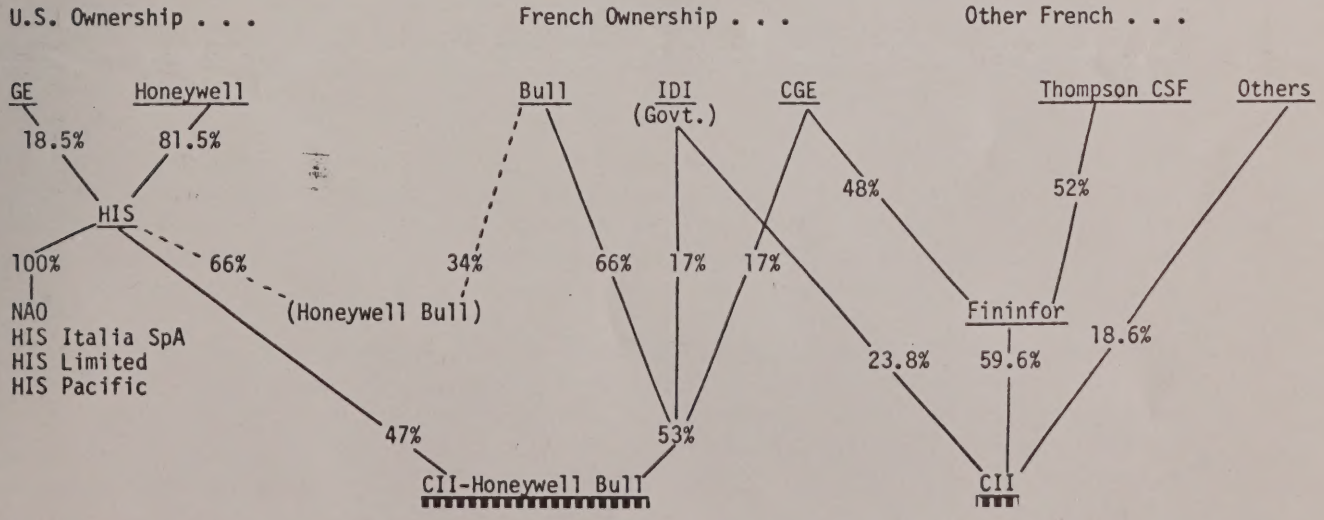
Hottest in the European market will be terminals and data communications gear. Numbers from one IDC study predict a 27% annual growth rate in this sector between now and 1980 . . . this in spite of the high line costs and network downtime that plague state-owned communications systems.

Honeywell's new family tree

But Honeywell's bid to become Europe's number two computer maker -- as it substantially alters the rickety structure of the industry, especially in France -- will have its effect. Under the plan, CII stockholder Compagnie Generale Electricite (CGE) and the French government -- presumably through its Institute for Industrial Development (IDI), also a CII stockholder -- will buy 19% of Honeywell's interest in Honeywell Bull.

Thompson CSF, CII's biggest stockholder and manufacturer of its small systems, meanwhile, will not be part of the merger. But under plans recently urged by the country's Industrial Minister, Thompson -- after buying CGE out of CII -- will form the nucleus of a revamped minicomputer and peripherals industry . . . to be helped by an alleged $55 million in government subsidies over the next few years.

Genealogy of the CII-Honeywell Bull company then -- not counting the proposed Thompson CSF regrouping in CII -- would look like this:



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Already as a result of the de facto split-up of CII -- and undermining of Unidata -- entailed in the merger, N.V. Philips has bolted both the consortium and the mainframe market . . . to regroup and attack the market from its peripherals and small systems strength. (Meanwhile, it is expected that Siemens -- the third partner in Unidata -- will continue doing its thing as Germany's second largest computer manufacturer.)

As for Honeywell -- which faces the headache of integrating yet another product line into its offerings -- the immediate benefits are twofold: 1) the addition of a percent or so to its market share in Europe, and 2) $50 to $60 million from the sale of its Honeywell Bull holdings. In addition, the company is now in a position to tap into that French government favoritism . . . which industry sources say might be good for as much as $250 million (FF 1.2B) in subsidies and another $850 million (FF 3.7B) in orders between now and the end of 1978.

The other players . . .

While the final form of CII-Honeywell Bull remains to be seen -- HIS says it hopes for merger completion by yearend 1975, operation by second quarter 1976 -- and the fate of CII, Unidata, Thompson, et al is not yet sealed . . . there are other vendors alive and (mostly) well in Europe. Principally:

- IBM -- with its major computer activity in Europe this year probably being the introduction of System/32 . . . Europeans like them small. Despite almost complete acceptance of the 370 series by very big companies, overall 370 acceptance seems to be lagging . . . and this month IBM moved to make the line more attractive by doubling the on-line disk capacity and speeding up the internal execution time of the 370/115 and and 125, and jacking the 115 memory capacity up to 256 KB.

- Univac -- which joined with Saab in a joint Scandinavian marketing venture. The company may have thus set the stage for further cooperative efforts overseas . . . and easier access to markets behind the iron curtain, where it has been aggressive lately (EDP/IR,Oct. 17,1975). On its own, Univac is beginning to find more customers for its 90/30s and 90/60s . . . as its respectable 9000 series base starts to age.

- CDC -- which took a bath in 1974 when the Union Bank of Switzerland pulled out of a joint development of a massive banking network, sending the whole deal into litigation (EDP/IR,Oct. 17,1974). The spiciest news this year concerning CDC overseas, in fact, has centered not in Europe but in Russia and Red China . . . where the company has written some handsome (yet unapproved) orders.

- NCR -- which finds the U.K. and Germany the most successful repositories for its small Century systems and 399 accounting computers. And now citizens of those countries -- as well as Switzerland -- can see their first supermarket POS systems courtesy of the U.S. autotransaction leader . . . with more destined to come.

- Burroughs -- which may find IBM's S/32 introduction more help than hindrance. The company, which claims to be a small business computer pioneer, is also well served by its accounting machine line . . . to which it most recently added the L 6100. France is Burroughs' most active market now . . . reflecting that country's current computer boom.

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DISTRIBUTION OF GENERAL-PURPOSE (GROUP A) COMPUTERS IN EUROPE -- YE 1974
(Copyright 1975 by International Data Corporation)

Manufacturer	No. Units	% Share	$M Value	% Share
IBM	20,749	50.8	9,143	54.4
HIS/Xerox	6,894	16.9	1,778	10.6
Univac	2,356	5.8	955	5.7
Burroughs	968	2.4	551	3.3
CDC	259	.6	547	3.2
NCR	2,313	5.7	342	2.0
Other U.S.	436	1.1	76	.5
Unidata	2,630	6.4	1,483	8.8
ICL	3,004	7.3	1,396	8.3
Other Europe	1,218	3.0	536	3.2
W. Europe Total	40,827	100.0	16,807	100.0

- ICL -- finally coming out with its high end "New Range" computers, the 2970 and 2980 (EDP/IR,Oct.24,1974) . . . and finally getting together with CDC and NCR in Computer Peripherals, Inc. In addition, sales of the company's small 2903 system have been heady, especially overseas . . . the company even kicked off a major U.S. marketing campaign with it. Company profits have been up, too. But still ICL has its woes: depressed stock prices, increased bank debt, plant closings and layoffs. Unidata's demise, then, comes at a good time for ICL.

- Nixdorf -- another company striving to establish a credible beachhead in the United States. At home the company's success -- and healthy balance sheet -- lies mainly in accounting machines and peripherals (often found on Honeywell machines). The company recently introduced a turnkey answer to IBM's System/32 -- the Nixdorf 8870 -- and in Europe, at least, it seems to be having more than a modicum of success.

. . . and their contest

All of the markets feel the recession's pinch. For mainframers it's mostly in the medium-scale systems business. Either companies already have their new systems -- IDC found most computers at the largest corporations in France and Germany had been installed within the last three years -- or they're simply putting off upgrades until later. And the fact that Europeans are heavy renters doesn't help manufacturers during uncertain times, either.

But the stereotypes of the European market are changing. France, for instance, is becoming a more fertile market for U.S. vendors. And with the shake-up of CII things may open up even more . . . making it easier for users to stray from old commitments, easier to accept change.

So besides nationalism, lack of user sophistication, support and marketing hassles, economic rip tides, and all the problems of doing business overseas . . . companies that do may find their marketplace breezier and less hidebound than before. And that can mean a lot of changes -- and opportunity -- in a market that's still growing at least as fast as the one at home.

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation -- but they are definitely estimates. Computer manufacturers, as a rule, do not directly supply this type of information. It is only through the use of IDC's extensive data files and other information sources that estimates such as those in this Census are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. These machines are byte or character oriented -- with the exception of large-scale scientific computers that have large words -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

Also, the Group A Census now includes the classification of computer models by size class -- based on the IBM product line (rather than constantly shifting average system values) and what other manufacturers' products compete with which IBM computers. There are seven size classes in all based as follows: Class 1 -- S/32; Class 2 -- S/3 (Mod 6 to 12); Class 3 -- 370/115; Class 4 -- 370/125&135; Class 5 -- 370/145; Class 6 -- 370/158; Class 7 -- 370/168. In a way, these classifications are arbitrary . . . so comments and suggestions from readers are more than appreciated.

AS OF JULY 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	CLASS	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Burroughs	B-200	3	$ 5,600	11/61	68	54	122	X
	B-300	3	$ 5,200	7/65	290	60	350	X
	B-500	3	$ 6,000	11/68	423	422	845	X
	B-70X/71X	2	$ 1,300	3/73	285	165	450	160
	B-72X	2	$ 2,000	4/75	5	-	5	40
	B-1712	2	$ 2,100	8/72	260	146	406	120
	B-1714	2	$ 2,250	8/72	382	220	602	170
	B-1718	3	$ 3,500	11/74	10	5	15	50
	B-1726	3	$ 5,900	2/73	207	75	282	70
	B-1728	3	$ 8,300	8/73	103	47	150	70
	B-2500	4	$ 8,900	2/67	145	110	255	X
	B-2700	4	$ 8,700	8/72	192	110	302	65
	B-3500	4	$ 16,000	5/67	550	310	860	X
	B-3700	4	$ 22,600	11/72	122	58	180	30
	B-45/4700	5	$ 27,300	10/71	192	134	326	40
	B-4790	5	$ 41,000	11/75	-	-	-	40
	B-5500	5	$ 35,000	3/63	68	27	95	X
	B-5700	5	$ 29,500	12/70	22	7	29	X
	B-65/6700	6	$ 57,500	11/69	90	74	164	10
	B-7700	7	$120,000	8/73	7	2	9	3
	B-7750	7	$135,000	9/75	-	-	-	1
	Subtotal				3,421	2,026	5,447	869
CDC	G-20	4	$ 19,600	4/61	3	5	8	X
	1604/A/B	6	$ 42,000	1/60	13	4	17	X
	31/3150	4	$ 9,100	12/74	82	47	129	X
	3170	5	$ 19,200	12/70	12	15	27	X
	3200	4	$ 14,700	5/64	46	44	90	X
	3300	5	$ 29,900	9/65	108	83	191	X
	3400	5	$ 23,700	11/64	4	8	12	X
	3500	5	$ 26,000	1/69	10	17	27	X
	3600	6	$ 49,000	6/63	13	9	22	X
	3800	6	$ 53,000	12/65	19	3	22	X
	6200	6	$ 39,000	11/70	2	6	8	X
	Cyber-72	5	$ 36,300	10/71	29	50	79	7
	Cyber-172	6	$ 41,200	7/75	-	-	-	12
	6400	6	$ 54,000	5/66	60	50	110	X
	Cyber-73	6	$ 51,700	3/72	22	40	62	6
	Cyber-173	6	$ 54,600	9/75	-	-	-	13
	6500	6	$ 74,800	12/67	20	15	35	X
	6600	7	$119,600	8/64	57	29	86	X
	Cyber-74	7	$115,500	3/72	6	7	13	2
	Cyber-174	6	$ 67,500	9/75	-	-	-	3
	Cyber-175	7	$ 84,000	9/75	-	-	-	X
	6700	7	$125,000	7/70	3	-	3	X
	7600	7	$171,600	1/69	15	6	21	X
	Cyber-76	7	$165,000	3/72	2	4	6	2
	Star-100	7	$250,000	12/73	1	-	1	2
	Subtotal				527	442	969	47
Digital Equipment Corporation	PDP-6	4	$ 10,000	10/64	14	8	22	X
	1040/1050	4	$ 13,300	10/67	187	75	262	11
	1055	4	$ 22,000	12/71	29	12	41	3
	1070/1077	5	$ 30,000	6/72	38	6	44	5
	1080	6	$ 30,000	6/75	1	0	1	1
	Subtotal				269	101	370	20
HIS	Gamma 10	2	$ 2,500	7/64	-	925	925	X
	Gamma 30	4	$ 10,100	2/62	-	120	120	X
	G-5X Series	2	$ 1,650	1/66	660	3,050	3,710	X
	G-100 Series	3	$ 4,100	4/66	227	1,450	1,677	X
	G-200 Series	4	$ 14,000	4/61	160	45	205	X
	G-400 Series	4	$ 16,650	5/64	250	331	581	X
	G-615/25/35	6	$ 73,300	4/65	46	45	91	X
	G-645	7	$112,400	7/66	2	1	3	X
	G-6025	5	$ 22,200	11/73	36	13	49	X
	G-6030/40	5	$ 37,000	6/71	85	110	195	X
	G-6050/60	6	$ 52,000	7/71	92	50	142	X
	G-6070/80	6	$ 68,900	7/71	38	14	52	X
	G-6180	7	$102,000	2/74	3	-	3	X
	G-Subtotal				1,599	6,154	7,753	X
	H-105/115	3	$ 4,350	3/70	1,175	480	1,655	X
	H-110/120	3	$ 4,050	1/66	327	226	553	X
	H-125	4	$ 8,400	12/67	60	215	275	X
	H-200	3	$ 6,500	3/64	368	184	552	X
	H-2020	3	$ 2,400	2/73	470	80	550	X
	H-2030	3	$ 5,150	1/73	92	20	112	X
	H-2040	4	$ 9,900	4/72	323	110	433	X
	H-1015	4	$ 12,750	4/71	105	58	163	X
	H-2050	4	$ 14,800	4/72	190	70	260	X
	H-12/1250	4	$ 12,700	2/66	260	140	400	X
	H-2015	4	$ 18,300	2/71	95	55	150	X
	H-2060	4	$ 21,000	4/72	95	20	115	X
	H-2200	4	$ 20,000	1/66	110	44	154	X
	H-2070	5	$ 25,300	5/72	63	11	74	X
	H-3200	5	$ 27,400	2/70	72	28	100	X
	H-4200	5	$ 31,600	9/68	24	5	29	X
	H-2088	6	$ 44,900	4/72	5	1	6	X
	H-8200	6	$ 74,500	2/69	22	4	26	X
	H-4/1400	4	$ 13,500	12/61	18	21	39	X
	H-800	5	$ 29,100	12/60	31	10	41	X
	H-1800	6	$ 46,900	7/64	7	4	11	X
	H-Subtotal				3,912	1,786	5,698	X
	Series 60							
	61/58	2	$ 1,950	1/75	60	240	300	450
	61/60	2	$ 3,300	1/75	40	130	170	
	62/40	2	$ 3,800	1/75	5	22	27	400
	62/60	3	$ 4,300	1/75	22	40	62	
	64/20	3	$ 7,400	1/75	13	24	37	260
	64/40	4	$ 12,700	1/75	-	13	13	
	66/10	4	$ 18,300	1/75	-	-	-	
	66/20	5	$ 23,300	1/75	30	15	45	
	66/40	5	$ 36,200	1/75	35	25	60	200
	66/60	6	$ 48,800	1/75	38	25	63	
	66/80	7	$ 90,000	1/75	5	-	5	
	68/60	6	$ 70,000	3/75	-	-	-	5
	68/80	7	$100,000	1/75	-	-	-	
	Subtotal Series 60				248	534	782	1,315
	HIS Total				5,759	8,474	14,233	1,315

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AS OF JULY 1, 1975

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IBM	System/32	1	$ 900	3/75	750	50	800	9,500
	System-3/6	2	$ 1,750	12/70	3,025	1,875	4,900	X
	System-3/8	2	$ 1,900	6/75	-	-	-	300
	System-3/10	2	$ 2,550	1/70	17,500	8,375	25,875	1,250
	System-3/15	3	$ 4,650	3/74	2,000	675	2,675	1,725
	370/115	3	$ 7,450	4/74	1,200	1,060	2,260	600
	370/125	4	$ 11,250	6/73	2,050	1,450	3,500	500
	370/135	4	$ 17,500	5/72	2,815	1,740	4,555	450
	370/145	5	$ 31,700	7/71	1,950	1,150	3,100	100
	370/155	6	$ 60,300	2/71	565	420	985	X
	370/158	6	$ 67,500	5/73	750	365	1,115	200
	370/165	7	$102,000	6/71	130	66	196	X
	370/168	7	$126,000	7/73	177	66	243	100
	370/195	7	$198,500	3/71	20	4	24	X
	360/20	3	$ 3,675	12/65	2,070	3,600	5,670	X
	360/22	3	$ 5,900	7/71	430	190	620	X
	360/25	3	$ 7,650	10/68	300	720	1,020	X
	360/30	4	$ 11,400	6/65	2,510	2,090	4,600	X
	360/44	4	$ 14,500	7/66	50	72	122	X
	360/40	4	$ 20,400	6/65	1,200	1,420	2,620	X
	360/50	5	$ 32,700	8/65	560	470	1,030	X
	360/65	6	$ 70,700	11/65	425	203	628	X
	360/67	7	$114,200	6/66	31	12	43	X
	360/75	7	$ 95,900	1/66	32	15	47	X
	360/85	7	$143,800	10/69	5	4	9	X
	360/95	7	$153,000	11/67	14	2	16	X
	Subtotal				40,559	26,094	66,653	14,725
	1130	2	$ 2,350	2/66	2,250	1,730	3,980	X
	1401	3	$ 3,775	9/60	762	710	1,472	X
	1401-G	2	$ 2,350	5/64	60	24	84	X
	1401-H	2	$ 1,325	6/67	20	35	55	X
	1410	4	$ 17,350	11/61	80	47	127	X
	1440	3	$ 4,800	4/63	145	150	295	X
	1460	4	$ 10,000	10/63	38	32	70	X
	1620	3	$ 2,750	9/60	242	195	437	X
	7010	5	$ 26,500	10/63	11	7	18	X
	7030	7	$163,200	5/61	3	1	4	X
	704	5	$ 32,600	12/55	1	1	2	X
	7040	5	$ 25,500	6/63	7	14	21	X
	7044	5	$ 37,200	6/63	8	10	18	X
	705	5	$ 38,800	1/56	2	3	5	X
	7070-74	5	$ 27,500	3/60	94	33	127	X
	7080	6	$ 61,200	8/61	40	1	41	X
	7090-94	6	$ 71,900	8/60	54	9	63	X
	Subtotal				3,817	3,002	6,819	X
	Total IBM				44,376	29,096	73,472	14,725
NCR	Century-50	2	$ 2,050	2/71	1,000	245	1,245	X
	Century-100	3	$ 2,980	9/68	680	925	1,605	X
	Century-101	3	$ 2,850	10/72	1,200	215	1,415	550
	Century-151	3	$ 3,500	2/75	48	10	58	100
	Century-200	4	$ 8,000	9/69	607	370	977	X
	Century-201	4	$ 10,000	8/74	90	20	110	100
	Century-251	4	$ 10,000	11/73	140	56	196	85
	Century-300	5	$ 22,600	2/72	48	28	76	5
	304	4	$ 10,000	1/60	4	-	4	X
	310	2	$ 1,000	5/61	13	10	23	X
	315	3	$ 5,000	5/62	285	340	625	X
	315-RMC	4	$ 11,800	9/65	47	38	85	X
	390	2	$ 800	5/61	200	124	324	X
	500	2	$ 1,150	10/65	640	1,325	1,965	X
	Subtotal				5,002	3,706	8,708	840
Philco	1000	3	$ 7,000	6/63	8	1	9	X
	210/211	5	$ 40,000	10/58	5	1	6	X
	212	5	$ 52,000	1/63	4	1	5	X
	Subtotal				17	3	20	X
Singer	System 10	2	$ 2,550	10/70	1,240	881	2,121	300
Standard Computer	IC-4000	3	$ 9,000	9/68	4	-	4	X
	IC-6000	4	$ 16,000	5/67	3	-	3	X
	IC-7000	4	$ 17,000	6/69	7	-	7	X
	Subtotal				14	-	14	X
Univac	I/II	5	$ 26,500	3/51	3	2	5	X
	III	5	$ 26,900	8/62	30	35	65	X
	SS-80/90	4	$ 8,500	8/58	10	16	26	X
	418-I/II	4	$ 14,500	6/63	68	60	128	X
	418-III	5	$ 20,800	7/69	44	55	99	X
	491/492	5	$ 28,600	12/61	15	12	27	X
	494	6	$ 44,300	2/66	49	44	93	X
	1004	2	$ 1,100	2/63	765	690	1,455	X
	1005	2	$ 1,730	4/66	580	180	760	X
	1050	4	$ 9,325	9/63	146	135	281	X
	1103/05	6	$ 37,100	12/50	-	3	3	X
	1106	6	$ 42,400	12/69	94	145	239	15
	1107	6	$ 60,400	10/62	5	13	18	X
	1108	7	$ 72,800	9/65	130	97	227	X
	1110	7	$ 90,100	6/72	38	49	87	10
	9200	2	$ 2,530	6/67	1,095	845	1,940	X
	9300	3	$ 4,300	9/67	830	840	1,670	X
	9400	4	$ 12,300	5/69	235	270	505	X
	9700	5	$ 22,900	8/72	10	17	27	X
	90/30	5	$ 8,700	2/75	65	35	100	600
	90/60	5	$ 17,200	1/74	135	52	187	150
	90/70	5	$ 23,300	11/73	60	27	87	65
	1100/20	6	$ 43,300	4/75	2	-	2	40
	1100/40	7	$113,300	7/75	-	-	-	35
	Subtotal				4,409	3,622	8,031	915
	301	4	$ 7,060	10/60	112	6	118	X
	501	5	$ 17,100	6/59	8	-	8	X
	3301	5	$ 24,100	7/64	53	-	53	X
	Spectra 70/15	3	$ 4,200	9/65	11	-	11	X
	Spectra 70/25	3	$ 7,400	9/65	2	2	4	X
	Spectra 70/35	4	$ 13,000	1/67	85	5	90	X
	Spectra 70/45	5	$ 24,000	11/65	235	18	253	X
	Spectra 70/46	5	$ 40,400	11/68	30	2	32	X
	Spectra 70/55	5	$ 38,400	11/68	7	2	9	X
	Spectra 70/60	6	$ 44,500	9/70	19	-	19	X
	Spectra 70/61	6	$ 50,000	3/71	10	-	10	X
	Spectra 1600	3	$ 3,800	1/69	65	-	65	X
	Spectra 70/2	4	$ 12,600	7/71	104	-	104	X
	Spectra 70/3	4	$ 20,400	10/71	19	-	19	X
	Spectra 70/6	5	$ 32,200	10/71	44	-	44	X
	Spectra 70/7	6	$ 39,900	10/71	21	-	21	X
	Subtotal				825	35	860	X
	Total Univac				5,234	3,657	8,891	915
Xerox	Sigma-5	4	$ 12,650	8/67	250	58	308	X
	Sigma-6	4	$ 20,000	11/70	39	8	47	X
	Sigma-7	5	$ 24,700	12/66	85	21	106	X
	Sigma-8	4	$ 19,000	9/71	25	9	34	X
	Sigma-9	6	$ 44,000	11/71	45	8	53	X
	530	3	$ 3,500	8/73	240	53	293	150
	550	3	$ 7,525	11/74	45	10	55	60
	560	4	$ 17,030	11/74	12	2	14	15
	940	5	$ 24,000	4/66	50	4	54	X
	9300	3	$ 8,500	11/64	18	4	22	X
	Subtotal				809	177	986	225
	TOTALS				66,668	48,563	115,231	19,256

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• A SYSTEM/32 BY ANY OTHER NAME is, at least in the processor, also an IBM 3791 communications controller, the heart of a 3660 Banking System . . . and now the engine in two other new IBM products. They are the 7840 Film Thickness Analyzer and the 7841 Textile Color Analyzer -- which marry the science of spectrophotometry with IBM digital processing. They come with an 80 cps printer -- like one also offered with the System/32 -- are totally turnkey, and cost $80,000 for the 7841, $85,000 for the 7840. It's purchase only. So how 'bout that.

• XEROX USERS HAVE A FOSTER PARENT, namely Honeywell, which made good on previous announcements that it was seriously dickering with Xerox for its user base. Honeywell will take over maintenance contracts -- receiving at least enough income from rental and maintenance fees to cover the cost -- and accept responsibility for other service and support functions. Xerox keeps Diablo and Xerox Data Services. No money changes hands as a result of the deal, and Xerox's $84.4 million after-tax write-off is not expected to be affected.

Another company, called Telefile, had tried to obtain the Xerox base but was rebuffed by the copier giant, which questioned its ability to handle the task. So Telefile went ahead and offered users the chance to come in under its wing directly . . . offering to buy a user's system when his lease runs out, replace memory and peripherals with more powerful ones of its own, and return it at nearly the same monthly rate as before. And the offer still stands, says Telefile, despite the Xerox/Honeywell pact.

• SERVO-SYCHRO FASHION, HONEYWELL'S PRICES WILL FOLLOW IBM'S: up 4% on equipment, 9% on most maintenance. Put the blame on inflation, says Honeywell.

• FOR THE NINE-MONTH PERIOD, OVER 1974: IBM revenues up 10%, earnings up 1%; Burroughs revenues up 10%, earnings up 13%; CDC revenues up 9%, earnings to $7.8M from a loss of $7.1M; NCR revenues up 12%, earnings down 6% (20% for 3Q); Honeywell revenues (includes control systems) up 5%, earnings down 32%; Sperry Rand revenues up 7% (6 mo.), earnings up 10% -- with commercial computer revenue up 12%.

• ADD THE IBM 3777 TO YOUR LIST OF 3770 TERMINALS. It's a high-speed, RJE device with a standalone printer that can hit 1000 lpm -- double the previous capacity. For a typical configuration, the new terminal will rent for $1565/month.

• JUDGE EDELSTEIN ON TRIAL? IBM PROTESTS TO CIRCUIT COURT . . . and oral arguments were heard on Wednesday, October 22. IBM lawyer, Thomas Barr, petitioned before the Second Circuit Court of Appeals, protesting the conduct of Judge David Edelstein, trier of the government's antitrust suit against IBM. Barr protests: 1) the judge has not filed certain IBM papers with the court clerk, 2) his ruling on October 6 that no oral motions will be accepted in the case is unfair, and 3) IBM shouldn't be required to furnish the Judge and the Justice Department transcripts of confidential interviews with potential witnesses.

DOJ lawyer, Bruce Nelson, pointed out that the IBM writ was unusual and asked the Circuit Court not to hamstring Edelstein this early in the game. He theorized that favorable action on the writ would open the way for scads more.

Throughout the hearing -- which should have an outcome soon -- the circuit court judges evinced concern on two main points: 1) that a complete record of this certain-to-be-appealed trial be kept, and 2) that Edelstein -- as a trier of fact -- not stray from the bench to get involved with either defense or prosecution of the case.

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INTERNATIONAL DATA CORP.

NOV 10 1975

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" NOVEMBER 6, 1975 • VOL.11,NO.6 P.J.McGOVERN,PUBLISHER

Edelstein stung in unusual appellate court writ -- page 7

AT LONG LAST: AMDAHL'S CHALLENGE TO IBM'S 370/168

. . . Another common element [of these competitive large-scale systems] is lack of comprehensive software, which will require considerable time to develop. This leads to the conclusion that, for the present, these systems will be restricted to the scientific user willing and able to develop or enhance software. The exception to this could be the Amdahl entry if it were able to use System/360 or System/370 software. [Emph. Add.]

-- IBM Quarterly Product Assessment, 1/20/72
Plaintiff's Exhibit #129, IBM vs U.S.

They're out there. Fruit of a $45 million investment and four-year gestation, the Amdahl 470/V6 was officially held before the public eye last month . . . breaking the four-year self-imposed silence of its maker. Though some systems have been in the field under evaluation for several months, the "announcement" served to focus outside attention on the company and its product . . . in an industry long intrigued by the concept of an IBM plug-compatible CPU.

And although the IBM product assessment quoted above concerned challenges to the 370/195 -- the Amdahl machine turned out to strike at the 168 -- IBM, at least in passing, even then recognized its implication. Crux of Amdahl's announcement:

- Three 470/V6 systems have been delivered, a total of six should be out by year's end. The first two have passed final acceptance.
- Primarily through DPF, Inc., Amdahl has arranged for $180 million in lease financing for its customers.
- Arrangements have been made with Fujitsu -- the major Amdahl backer and 470/V6 manufacturer -- for $25 million in credit.

Subsequent to Amdahl's press presentation, another system has been shipped, leaving two more to go out this year . . . and, says the company's controller, if that shipment rate is "annualized," it means the company is already operating in the black. The company has also admitted that it may try a second stab at going public . . . a previous attempt in 1973 failed.

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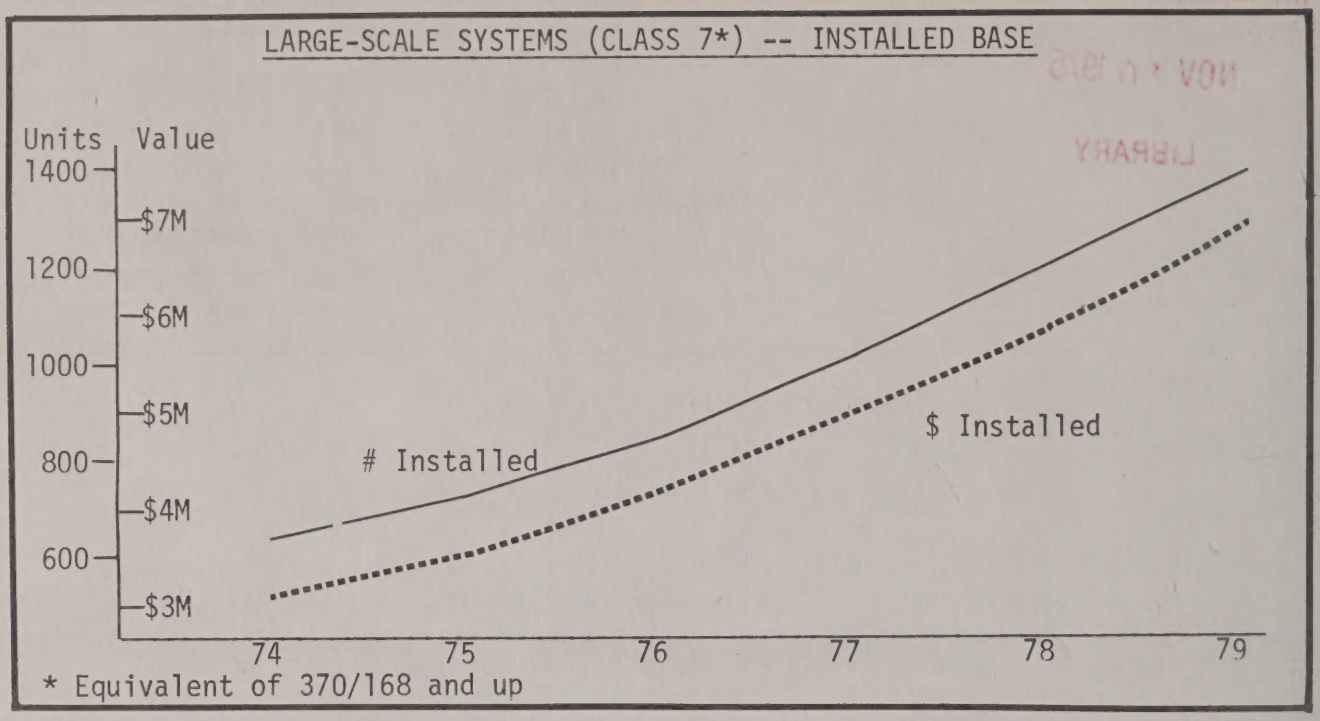

Looking under the hood

The 470/V6 runs all IBM software as the "functional equivalent" of an IBM 370/168. "In any customer situation where an IBM 370 or 360 is being used to run any set of programs, using any peripheral mix, the 470/V6 can be substituted, making no more changes than would be made to change from one model of the IBM 370 to another." In the remote event that IBM hides special software "jimmys" aimed at the 470/V6 in later program products . . . they'd probably also affect IBM computers. Thus, except for price slashes, the 470/V6 is immune to all but a whole new high-end model . . . a bridge which Amdahl says it will cross when the time comes.

Advantages to the 470/V6 over IBM machines lies in its use of the latest LSI technology -- which provides:

+ Machine cycle time of 32.5 nanoseconds, over half the 370/168's
+ A standard of 16 (vs. 12) channels
+ One-third the physical size of the 370/168
+ Design -- using LSI logic circuitry -- to yield speed, size, and reliability advantages
+ Air cooling
+ A price between $3.7 and $6.0 million (vs. $3.8 to $5.7 million)

Also with the 470/V6 comes a minicomputer-controlled console -- which ties into a maintenance center, called the Amdahl Diagnostic Assistance Center (AMDAC), by phone lines. Thus, should the need arise Amdahl engineers can tie into the diagnostic nervous system of any installed 470/V6.

Finally, for its customers the company has arranged for DPF, Inc., to provide $160 million in lease financing for commercial customers wanting five- and seven-year leases. For state and local government and state university contracts, the First Municipal Leasing Corporation of Denver will provide $20 million . . . at long-term prices even for installations limited by law to one-year contracts . . . made possible by lease insurance from Lloyds of London.

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Re: Action from IBM

Almost any serious computer industry observer these days thinks announcement of an IBM 370/178 is imminent . . . some expecting it even as a reaction to 470/V6 publicity and success. Another school of thought -- more along EDP/IR lines -- foresees such a machine as much more than that. In any event, the odds are good that when such a top-of-the-line system comes along it will presage later IBM announcements . . . hinting at the nature of what once could be called "FS" and "Q."

EDP/IR -- after discussion with other industry observers, a review of computer industry history, and some quiet contemplation -- sees some hints to IBM's future direction distilling out of the possibilities:

- Long term, the IBM product line will probably be built around two processors -- one a small "motor" evolving from the processors in the 5100 and/or S/32; the other a large "engine," probably previewed in the 178.

- The 178 -- a bridge machine to the next IBM family as the 360/85 was to the 370 -- will be a multiprocessor, perhaps a mix of "engines" and "motors." Specialized built-in satellite processors might handle communications, mass memory (bubble?) use, and peripherals management.

- By mid-1976, the 178 will likely be joined by new, smaller processors (the 118 ... 148?) -- probably using some of the 178 architecture, and perhaps designed to take advantage of smaller 3850's yet to come.

In net, IBM seems certain to announce new systems soon . . . simple balancing of production facilities would seem to demand it. And to EDP/IR it seems clear that IBM is beginning to offer users a number of alternate growth paths . . . whether pressured by user demand, antitrust considerations, or simply the desire to manage a growing corporation well. This means more rapid insertions of technology (product announcements) . . . and leads, perhaps, to necessary endorsements of concepts which may be handled better by competiors than the Giant.

Meanwhile, back in the here-and-now, one could expect Amdahl to keep pecking away at IBM's large-scale base. And if, says a spokesman, "we succed beyond our wildest dreams, why IBM might even notice us."

\+ + + +

UNTAPPED POTENTIAL EDP SPENDING ESTIMATED OVER $13 BILLION FOR 133 INDUSTRIES
HEALTH CARE, WHOLESALE, RETAIL, FINANCE . . . BEST POTENTIAL FOR AUTOTRANSACTION

How much do users in this country spend on data processing each year . . . and how much could they? How much per user? Which markets and which industries are yet untapped, which most saturated? How do they interact with one another?

These are the questions that suppliers of EDP equipment and services -- and especially those autotransaction appliance and service vendors carving niches with industry-unique products -- must answer if they want to stay afoot in the fast-changing business of data processing. And decisions made now can affect survival months and years down the pike. Where does tomorrow's EDP buck lie?

To find out, International Data Corporation (IDC), publisher of EDP/IR, recently conducted a major study of EDP spending -- and potential spending -- for each of 133 distinct industries:

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EDP "REMAINING POTENTIAL" -- INDUSTRIES OVER $300 MILLION
(Copyright 1975 by International Data Corporation)

Industry	SIC	1974 Spending	Remaining Potential ($M)	Autotransaction Potent. ($M)	Rank
Hospitals	806	$ 370	$2,697	$281	3
Commercial & Stock Savings Banks	602	1,416	585	304	2
Automotive Dealers	551	5	496	453	1
Grocery Stores	541	195	447	79	14
Groceries & Related Products Wholes'rs	504	137	389	268	4
Oil, Gas, & Petro.	13&29	386	360	12	71
Department Stores	531	410	356	33	33
Savings & Loan Assoc.	612	112	346	187	6
Motor Vehicles & Eq. Manufacturing	371	500	336	13	68
Machinery, Equip., & Supplies Wholes'rs	508	69	323	222	5
Fire, Marine, & Cas. Insurance	633	188	307	60	22
Trucking, Local & Long Distance	421	128	306	151	7

+ Taking the size of each industry and the ratio of EDP spending to sales (or bedcounts, deposits, etc.) for its leading-edge users, IDC first formulated a theoretical EDP spending potential for that industry, then subtracted current spending . . . to find the "remaining potential."

+ Further, IDC broke out that portion of "remaining potential" lying with firms of a size most likely to spend between $10,000 and $200,000 a year on data processing . . . the most likely market segment for suppliers of autotransaction equipment or services.

Figures from the IDC study are based on 1974 spending in support of general-purpose computer installations only. Thus, current outlay for services or minis has not been factored in -- which could have an effect on the absolute values of "remaining potential." Also, spending includes that for nonequipment items, too . . . such as personnel costs, which account for 41% of the average budget.

The study, which serves best, perhaps, to highlight target industries for vendors after the small businessman's data processing dollar, found:

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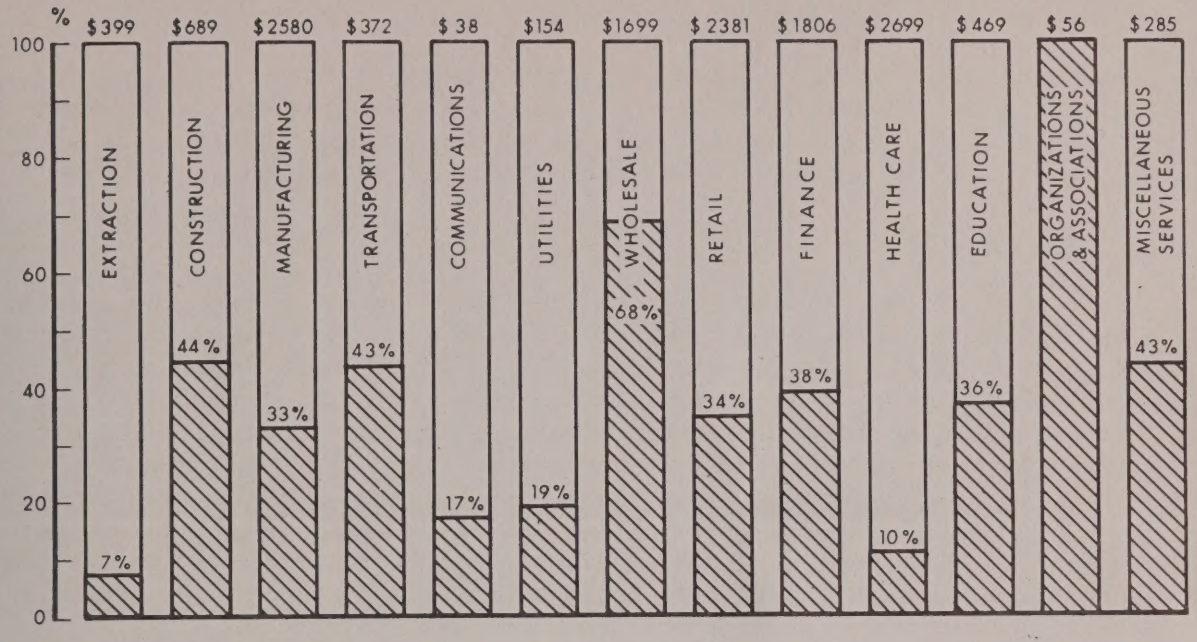
INDUSTRY AGGREGATES: AUTOTRANSACTION POTENTIAL TO "REMAINING POTENTIAL"



- For specific industries, *Hospitals (SIC 806)* leads the pack for "remaining potential" with a total of almost $2.7 billion -- almost five times the next largest market. But only slightly more than one-tenth of that is attributed to hospitals ripe for autotransaction . . . as most hospitals today come nowhere near the EDP spending per patient of the largest hospitals, many smaller ones probably never will.

- *Automotive dealers (SIC 551)*, on the other hand, show an autotransaction potential fully 90% of their "remaining potential" . . . and comprise the single largest potential market for autotransaction equipment and services with an untapped $453 billion. The dealers are third highest in overall "remaining potential."

- Spurred by the POS craze, the *Retail* industries show an aggregate overall "remaining potential" over $2.3 billion. The autotransaction portion of that is over $800 million -- almost as much as total 1974 EDP spending. *Grocery stores (SIC 541)* rank fourth in "remaining potential" yet thirteenth in 1974 actual spending . . . foreshadowing the future impact of supermarket POS.

- An even better autotransaction market arises from the *Wholesale* industries -- with an aggregate "remaining potential" of $1.7 billion and an autotransaction potential two-thirds that. Again it's the *Groceries and related products (SIC 504)* contingent pacing the industry.

- By far, the biggest overall (spending + potential) aggregate is *Manufacturing* -- yet at $2.6 billion its "remaining potential" ranks behind the health care industries and only slightly ahead of retail industries. Autotransaction accounts for 33% of that.

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- Next biggest aggregate is *Finance*. But while banks, insurance companies and real estate operations spent a whopping $2.6 billion in 1974 . . . their "remaining potential" is only about two-thirds that, their autotransaction potential one-fourth.

IDC found eighteen industries with over $200 million each in "remaining potential" with a total of $8.4 billion. Of that, $2.4 billion was deemed autotransaction potential. The total for all 133 industries examined by IDC came to $13.6 billion in "remaining potential" -- over a third of which was autotransaction.

Picking an industry

Based as it is on the habits of the leading-edge EDP users, the potential spending estimates calculated by IDC may be high. Smaller users may not need or be able to justify all the applications of the bigger operations . . . and some of the potential may already be siphoning into services or mini purchases. But then, the calculations also leave out spending on appliances or services not yet devised . . . technology may have its say in where tomorrow's EDP buck does come from.

More important, though, is the potential of a market relative to others. For whatever monies will eventually be unfrozen for EDP use, competition for them will be vigorous . . . and more and more it looks as if industry-unique products or services will have the edge on general-purpose competition.

IBM's System/32 offers a case in point. Though marketed overseas as a general-purpose small business computer (EDP/IR,April 30,1975) . . . at home it's being tailored for specific industries. And by no coincidence has IBM chosen as target industries for its first Industry Application Programs (IAPs) -- which the Giant is pumping out now about one a month -- some of the same industries that IDC's study reveals as having a high "remaining potential" . . . hospitals and wholesale food distribution are two prime examples.

But beyond dodging the Giant, there are other factors to consider . . . such as how to utilize relationships between industries. For example:

- Apparel manufacturing -- a $100 million autotransaction market -- might well be linkable to wholesale and retail operations, also big markets. Early warning signals from outlets to manufacturers on hot and cold lines could alleviate distribution and/or backorder problems . . . making for more efficient milking of the fads of fashion.

- The drug industry's market research function could be vastly simplified by input from pharmacists' applications . . . the prescription process eased by plugging doctors' offices into the net.

- In building construction -- an extremely diverse industry -- some applications may serve more than one sector, like job costing. And tied to an order entry system, for instance, such an application might find a market big enough to make regional concentration feasible.

But with the immense capital resources and farflung marketing organization IBM can bring to bear on untapped EDP markets . . . the Giant looms as the single largest question mark other suppliers must face. And once a guess is made as to which targets IBM most likely has in its sights, competitors must determine -- in light of their own abilities -- if the IBM presence is "good news" or "bad news."

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Edelstein chastened

APPEALS COURT STRICTURES IBM TRIAL JUDGE, VACATES PROTESTED ORDERS
WHILE OTHER PRETRIAL RULINGS BECOME SUBJECTS OF CONTROVERSY

This one was IBM's round. In a rare instance of appellate court "hands-on" dealing in district court affairs, a three-judge panel in New York's Second Circuit Court of Appeals issued the "writ of mandamus" requested by IBM in protest of Judge David N. Edelstein's handling of the case (EDP/IR,Oct. 24,1975). The disputed orders are thus vacated.

The Circuit Court ruling is a blow to Judge Edelstein -- who clearly issued the objectional edicts only in the hope of speeding up the trial process -- and may dampen the ardor of the only trial participant to date who's shown any measurable concern about the trial's pace. The Circuit Court ruling could easily lengthen the trial . . . as lawyers suddenly find they have more objections, now that they don't all have to be in writing.

But if IBM's plea, as some claim, was nothing more than ploy, it could backfire . . . for the writ diminishes grounds for appeal merely on the grounds of procedure or judicial mismanagement. So look for a longer but more airtight trial . . . and a legal process that hopefully will boil down to issues alone.

The Circuit Court decision isn't the only important development arising out of the procedural matters of the trial:

- IBM has asked for a rescinding of the "Gag Rule" -- otherwise known as Pretrial Order 4. Although the company was the prime mover in instituting the rule in the first place . . . the Giant now claims violations by the DOJ. Crux of the complaint is that the DOJ, by using the Computer Industry Association as "consultant," has broken the silence . . . and to a highly anti-IBM medium at that. IBM also petitions the right to discuss the case with stockholders and employees.

- Pretrial Order 3, which concerns handling of confidential material, also surfaced last week. An NCR witness -- with the document in hand -- refused to hand an NCR 5-year plan over to IBM lawyers . . . claiming it was confidential information which IBM would use against NCR.

There's been no ruling by Edelstein yet on the "Gag Rule" matter, but interestingly he returned IBM's brief for resubmission because it failed to mention that confidential memos were included . . . which the Judge might have placed on public record in violation of Pretrial Order 3. IBM has resubmitted, the DOJ has briefed its side, and all that remains is rebuttal and a ruling from the bench.

But the Judge did rule on IBM's motion to compel NCR to hand over the 5-year plan, and -- in his first ruling since the Circuit Court rebuff -- came down in favor of the Armonk mainframer. NCR, though, still has chance to appeal.

What's ironic in this case which traditionally deals with issues born during the salad days of the 360 . . . is that the NCR 5-year plan in question is that company's latest. For observers and competitors trying to psyche out the Dayton mainframer, such information in the public record could be a real windfall. And for other companies which may be called to testify, it sets a precedent that must send shivers down the corporate spine.

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• TAKE THE CORE OUT OF THE 3705 AND PUT IN SEMICONDUCTOR, says IBM, and you'll have the 3705-II communications controller it just announced. (Old style 3705s now become 3705-I's). Besides faster memory, the new model comes with hardware and software improvements that speed up its internal workings -- such as block transfer, "cycle steal" features, faster emulation modes, 56K bps line transfer capability, etc. All are also available for the old 3705, too. Another major change now lets the 3705 connect to two computers, even under different access modes. This feature was available before only under RPQ. MAC rental prices for the new 3705s run from $1600 to $7000 a month, depending on configuration; shipments are planned for 3Q 1976.

Also announced by the Giant were two new "C" models of the new 3350 disk system -- "A" and "B" models were announced last July. In multiple disk hookups, "A" models act as drivers, "B" models as slaves. The "C" models just announced come in as the cross product . . . acting normally like "B" models, yet containing enough control circuitry to take over if the master "A" model fails. Storage capacity remains the same, but the price is higher. A 2-year ETP monthly charge for a C2, for instance, is $1500 . . . versus $1450 for an A2, $1150 for a B2. First shipments of the "C" models are slated for 2Q 1976.

• LOOK FOR A NEW FAMILY OF COMPUTERS FROM BURROUGHS, says its Chairman of the Board, Ray W. MacDonald. Talking to a bunch of New York security analysts late last month, the mainframer chief said, "Within the next few weeks we will announce the first models in a new family of computers which we will call the '800' systems." The first model -- a big medium-scale system -- is already in production, with first shipments scheduled for early 1976; both larger and smaller systems will follow. Independent of the '800' series will be a new family of small systems, to be announced early next year.

Meanwhile, the Detroit company has announced new "full service electronic teller terminals" called TU 1700. The terminals come with a 60 cps printer, choice of video display, and hand-held keyboard for customers to use for entry of their personal identification numbers. Two types of magnetic card reading modules are also available. TU 1700 lease prices range from $7000 to $9800; deliveries should start before the end of the year.

• USE OUR NEW IBM PLUG-COMPATIBLE DISKS AND CUT MONTHLY CHARGES 15%, says CDC about two systems introduced last week: the CDC 33401 and the 33441. Both drives use sealed cannisters -- the data modules -- to store from 35 to 280 megabytes and come with options for fixed-head storage (.5 or 1 megabytes). CDC touts the fact that, unlike its IBM match, the 33401 data module is operator removable . . . and the 33441 data modules can be moved to other spindles by a customer engineer in the case of drive failure.

Both drives operate with CDC's currently available 38302 storage controller (as well as IBM controllers), and therefore can be used with the CDC 38500 Mass Storage System. In IBM shops only 3330s may be used with a mass storage system. Under one 38302 controller, capacity of a 33401 subsystem ranges from 70 million to 2.24 billion bytes, capacity of a 33441 from 70 million to 4.48 billion. First production deliveries of the systems are still more than six months off, and prices are not yet available . . . except CDC claims monthly lease prices will be 15% below IBM's, purchase prices 25% below.

• WE'RE COMING ALONG TOO, GENTLEMEN, was the upshot of Sperry Univac price increases announced last week. Maintenance charges for all products and systems will go up 9%, and certain terminal devices will go up 5% in rental prices.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" NOVEMBER 24, 1975 • VOL.11,NO.7 P.J.McGOVERN,PUBLISHER

Minis in the news

FALL PRODUCT ANNOUNCEMENTS PACE MINICOMPUTER INDUSTRY
OEM MARKET REVIVES AS RECESSION LIFTS; 1975 SHIPMENTS HEAD FOR $1¼ BILLION

A year ago even those normally bright-eyed, easy-smiling, optimists -- the marketing bosses of the minicomputer industry -- had worried looks on their faces. It was the economy. Orders had begun to tail off, the OEM market was softening, the crunch for capital was on . . . while prices and competition stayed at their usual high-strung levels. Spokesmen were optimistic, of course -- and there were signs of relative strength -- but predictions were laced with caution.

Now, for most, those worried looks have loosened a little. Though the economy is still a major worry -- especially where money costs and inflation scrape against a company's bottom line -- the pressures of recession seem to be easing.

Once again, manufacturers seem able to focus on more mundane matters like product cycles, technology assessment, marketing strategy, and so on . . . the nitty gritty of keeping bouyant in an industry that should ship $1.25 billion worth of goods this year, a third more in 1976.

And it looks like indian summer came again to the mini industry. Apart from the normal kind of chaos -- Data General's drubbing of DCC in a patent suit, General Automation's executive fire drill, a DEC mini starring in the movie "Three Days of the Condor" -- recent events with some longer run implications have been:

- Sunny financial reports from DEC and Data General -- half of miniland -- for the last quarter. Others show mixed returns -- but encouraging and healthy overall -- with growing orders and backlogs.

- Revitalization of the OEM sector . . . after almost a year of strung-out deliveries, inventory gyrations, and tight-money woes for buyers.

- New product announcements. Of the eight companies with 1974 minicomputer revenues over $30 million, five have announced major new offerings in the last six weeks, mainly aimed at low-end OEM markets.

- Shifts in product emphasis or renewed commitment from several major manufacturers . . . showing a self-awareness, perhaps, of the industry's toughening requirements for entrance and survival.

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A Mini Is a Mini Is a Mini is a . . .

. . . matter of definition, more than anything else, these days. And International Data Corporation, publisher of EDP/IR, has come up with a working definition of minicomputer -- as opposed to small business computer, autotransaction appliance, or specialized computer. A minicomputer, proposes IDC, is:

+ General-purpose by design
+ Sold as a tool, not just as a solution
+ Available as a system, with operating software and peripherals
+ Offered with OEM discounts
+ Word-oriented versus byte-oriented
+ Offered with a memory of at least 4K words, random access
+ Generally sold, not leased
+ Under $25,000 in base price, or in a family with some members which are under $25,000 in base price

Note that a System/7 or 5100 is not a minicomputer, and IBM is not a force in the market (though certainly a force on it). Says IBM anyway, "We have a problem understanding what a minicomputer is -- we're into small systems."

As such, then, a minicomputer turns out to be pretty much what the industry assumes it is . . . one of those things that competes with what DEC makes. And while minis are not many things -- like small business systems -- they do end up in many of those things they are not. Calculatorus minimus.

OEM pick-up

Mainstay of the minicomputer industry has always been the Original Equipment Manufacturer (OEM) sector -- which last year took delivery of two-thirds of the 34,000 units shipped in the U.S. Though the numbers count for only 42% of the shipments by value, OEM business is still the industry's bedrock and first layer of product development. Quantity buys provide revenue and feedback to the production "learning experience" . . . at less development and support cost per unit.

The catch comes when an OEM's own business -- whether it's making automobiles or driving airplanes -- feels the pinch. Trimming of orders and inventories to accommodate slower growth has an immediate and direct impact on an OEM's suppliers . . . amplified by the fact that he may constitute a single large hunk of a vendor's business. And until recently, many OEMs were feeling the pinch.

But now, say industry participants, OEM business is perking up. And two of the reasons frequently cited have particular long-term implications:

- A decrease in the cost of money is enabling OEMs to step up their own product plans, and

- Recession-delayed OEM design cycles seem to be starting up again . . . which bodes well for the mini industry over the next 12 to 18 months.

And for convalescing OEMs that are in a design phase and in the market for minicomputer processing power, the industry has graciously just restocked the supply cabinet. Most of the new products are aimed at the market currently being tapped by DEC's LSI-11s, PDP-11/03s and the like . . . the fur should really fly when shipments crank up in 1976. The newest combatants:

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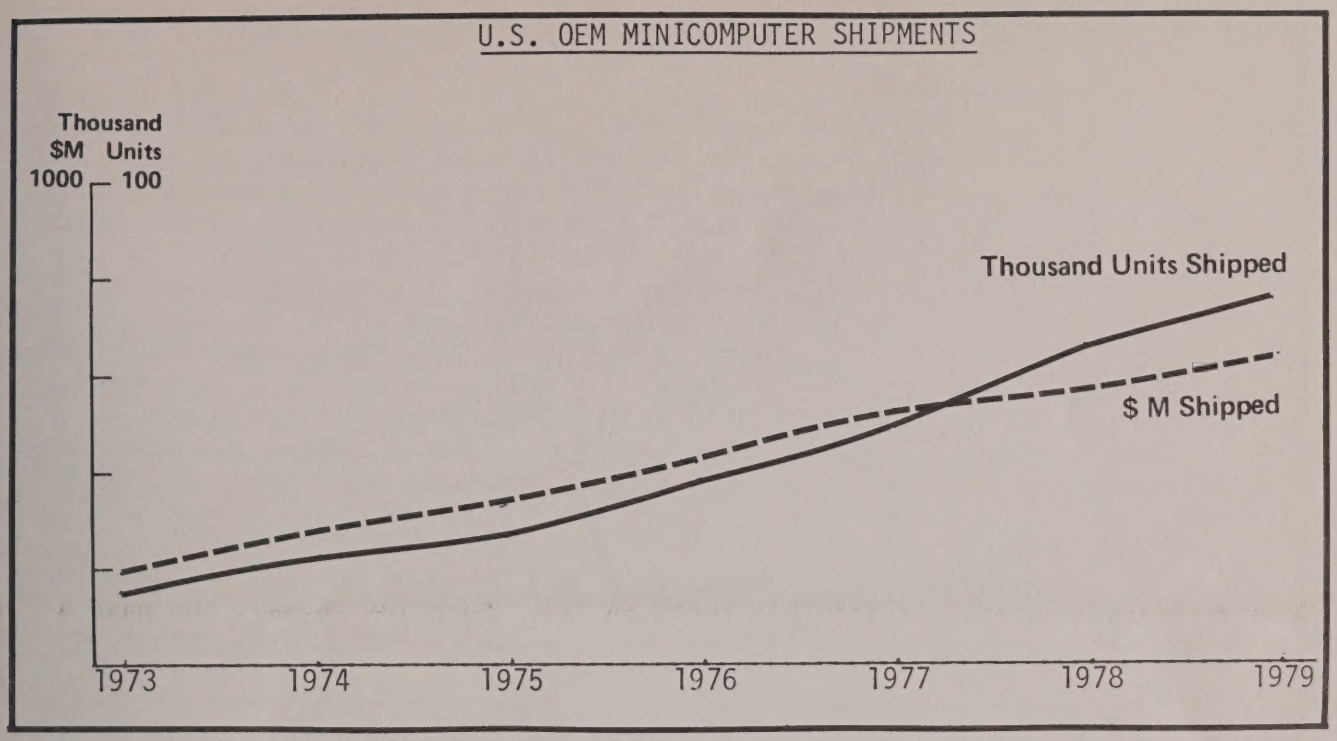

Data General's Nova 3 -- a two-member family offered in either core or MOS memory configurations of 4K to 128K words. Memory cycle time is 700 nanoseconds for semiconductor versions, up to 1000 ns for core machines. The computers run with traditional Data General peripherals and software . . . are primarily more powerful and less expensive versions of the Nova 2 series. Prices run from under $2,000 (OEM quantity) to over $35,000.

In conjunction with the Nova 3, the company announced that it is now manufacturing its own 4K semiconductor RAM chips . . . with Texas Instruments as second source. Such vertical integration, says Data General, will give the company a long-term edge over it's competitors in the small computer market . . . including many microprocessor competitors as well.

Texas Instruments' Model 990 series -- a 16-bit product line with roots in the microprocessor realm. The family starts with the one-chip TMS 9900 microprocessor, includes the single-board 990/4 microcomputer based on the 9900, and tops off with the 990/10 general-purpose mini. Memory on the 990/4 can expand to 58K bytes . . . while memory mapping techniques with the 990/10 support expansion up to two megabytes. Various operating system software packages and language compilers are available. Price for a 990/10 with 16K bytes of memory, chassis, power supply, and programmers panel is under $2,000.

The real thrust of the new TI family lies in its micro-to-mini compatibility -- made possible because the CPU chip architecture and software was designed with such upward expansion in mind. The microprocessor, in fact, will probably not compete with less powerful micros already on the market -- such as the Intel 8080 -- but instead contribute to TI's blanketing of the low-end mini market. Depending on how the software pans out, say TI competitors, the new series could leapfrog the semiconductor monarch into mini industry prominence.

General Automation's "Solution Series" -- a systems family that runs from a single-board microcomputer (with memory expandable up to 64K) -- to a "maxicomputer" that can address up to 1 million words of memory. The GA/16 -- dubbed the

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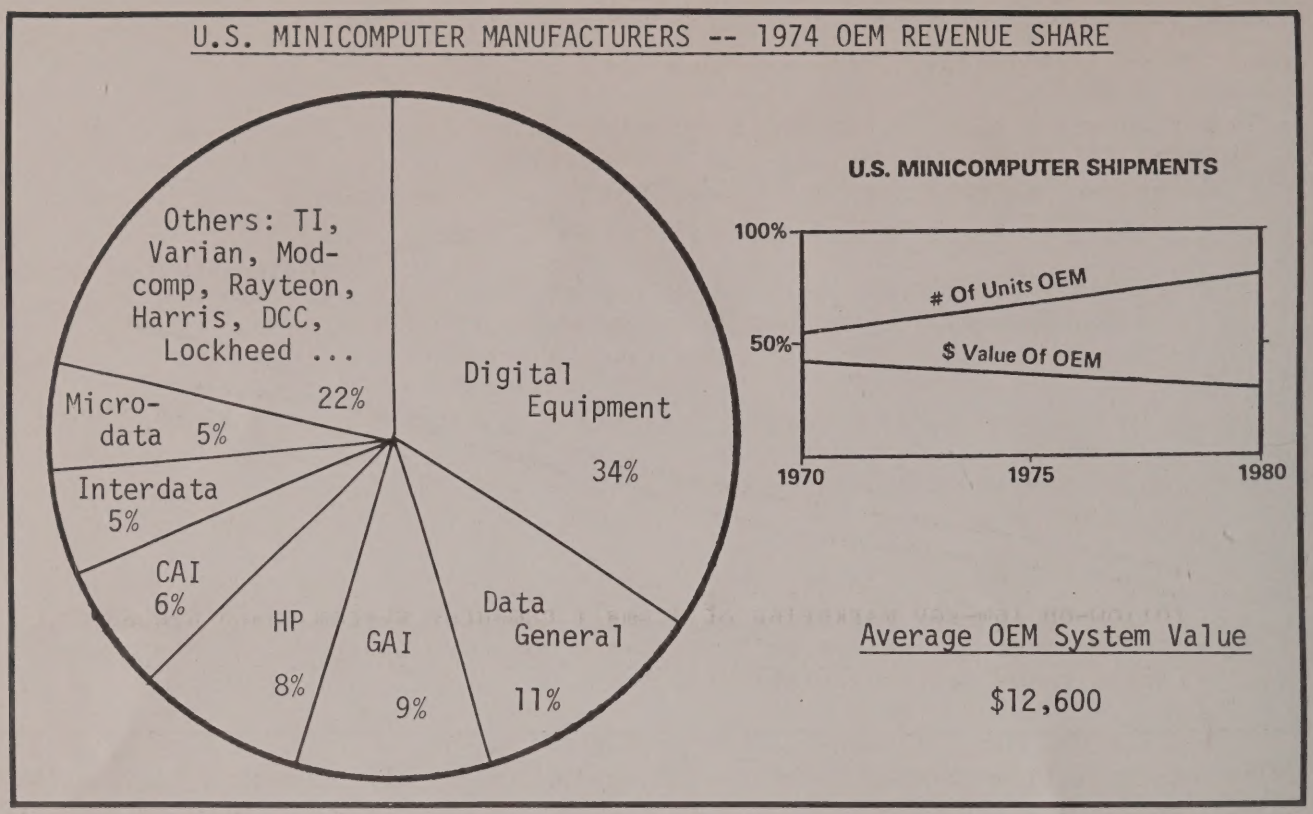

"Solution Series" -- is software and I/O compatible with the company's SPC/16 minicomputer family. Prices on the four members of the family run from $531 for the smallest to $5,370 for the biggest (with 16K of 720 ns memory).

Interdata's 6/16 -- a higher-performance, less expensive version of the company's 7/16 computer. Memory can run to 65K bytes, either semiconductor or core, and the system will be upward compatible with other Interdata systems. Says the company, the 6/16 is 30% faster than its predecessor -- yet costs only $1,364 in 8K semiconductor configuration. Later, adds the company, new software and peripherals will be announced . . . though the 6/16 runs with the current fare.

Varian's V76 -- a semiconductor machine using 4K RAM chips, comparable in performance with the company's V73 . . . thus aimed a little higher on the mini line than offerings from the companyies above. With 128K words of memory, power supply, expanded instruction set and other standard features a single V76 costs $28,450 . . . but an unbundled single processor with a minimum of one memory card costs $5,400. Thus Varian hopes to make its V70 line more attractive to OEMs -- who weren't so eager to buy the company's V73 and V75 (announced last March).

The search for identity

The minicomputer industry is always in a state of flux. But it may also be fast approaching a threshold . . . a point as the industry matures where it's no longer just anybody's game. The slow pruning of mainframers from the general-purpose industry -- undergoing such intensive review these days in Judge Edelstein's courtroom -- attests to the changing nature of technology-driven industries. Being around ten years from now, say -- when the mini industry's about the size the general-purpose industry was when RCA and GE left -- may demand tough decisions and wholehearted commitment right now. The industry's fantastic growth -- which can hide a multitude of sins -- will be tailing off to less than 20% before the 1980s.

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And there are signs that survival planning -- or the search for corporate identity -- is underway. Some examples are:

- A recent speech by Honeywell President E.W. Spencer at a Boston luncheon affirming that HIS is gearing for a major push in the mini market. Internal information that found its way into the hands of the press hints that a new mini was due in September . . . but was delayed.

- General Automation's executive reorganization . . . coupled with the renewed emphasis on OEM business represented by the "Solution Series." Says the company, "1976 is our 'turnaround' year."

- TI's new product line itself. The company's previous minis appealed to a restricted customer base . . . but now the semiconductor industry leader has shown that it doesn't intend to take a back seat in either the mini or micro markets.

- Computer Automation's formation of a Commercial Systems division and follow-on low-key marketing of a small computer system based around its "Megabyter" and specially designed software (over which Datapoint claims trade secret violations).

Besides the natural forces of technological change and economic reality that drive the mini industry from within . . . there are outside forces at work as well. Chief among these is probably IBM, with its ability to forge new markets for itself -- and for entrepreneurs in the right place at the right time. The "problem-solving" 5100 desktop computer might someday be a case in point.

And some say there's another industry giant out there that might someday affect the mini industry: Ma Bell. Though scenarios are still in the speculative stage . . . they generally have AT&T wending its way into data processing (as a counter to IBM in satellites?) along the communications controller/intelligent terminal route. Eventually such inroads could well have an impact on the minicomputer industry -- a major supplier of "components" for networking, data communications, and data entry. The toe-in-the-water, some say, is the AT&T's Dataspeed-40 terminal . . . which the company beefed up last month to handle clustered configurations (up to 24 keyboards, 12 printers).

But if such speculation ever does find its way into the patterns along which the mini industry evolves, most industry participants will be too close to the weave -- too active in its making -- to ever tell. Asked about the future, they may well come up with the answer a General Automation spokesman did when asked about the state of the economy: "I don't know, we've been too busy to notice."

Legal Heat in Miniland

In the beginning was DEC, and DEC begat Data General. Then Data General begat Digital Computer Controls -- and, contends Data General, trade secrets were swiped along the way. Last week a Delaware chancery court agreed -- saying it will issue a permanent injunction enjoining DCC from using the logic designs from either the Nova 1200 or DCC D-116 for making Nova 1200-compatible computers. DCC has naturally said it will appeal the decision in the 4-year-old case and well it should . . . for the D-116 is the heart of the company's product line and an injunction barring its production could well be a death knell for the company. Such is the perilous nature of life in miniland.

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EDP arms race

EAST GERMAN RYAD-40 DEBUTS IN WASHINGTON, D.C. -- OUTRUNS IBM 370/145
CDC CALLS FOR $25 BILLION TECHNOLOGY EXCHANGE WITH EAST BLOC

At CDC's unique inner-city Capital Facility in Washington, D.C., American journalists this week got a rare peek at a rare computer: the EC-1040, otherwise known as the Ryad-40. Present were William Norris, President and Chief Executive Officer of CDC, and Fritz Wokurka, Director of Kombinat Robotron -- the East German outfit that makes the system CDC was showing off.

Thought generally to be the processing equivalent of the IBM 360/40 -- carbon copy, in fact -- the communist 256K, 512K, or 1,024K byte machine is nothing of the sort, says CDC. It performs 380,000 operations/second . . . comes with sophisticated microprogramming. Under CDC's own analysis, the EC-1040:

+ Fell between the IBM 370/145 and 370/155 in a theoretical analysis (called "Gibson Mix") of CPU performance as applied to scientific and arithmetical calculations.

+ Chalked up a speed advantage of 3 to 4 times that of an IBM 370/145 in actual tests of CPU performance of arithmetic common to scientific/engineering applications.

+ Performed at only half the speed of a 370/145, though, when memory speed was a limiting factor . . . it would have performed even slower, were it not for the advanced microprogramming, lookaheads, etc.

+ Was fully compatible with IBM 360 software . . . tested on real-life jobs for Service Bureau Company (SBC) customers.

But while the CDC statistics were impressive -- compared to previous notions of what a Ryad-40 might do or not do -- they lacked the one benchmark that American businessmen are most familiar with: price.

And the gentlemen from the German Democratic Republic couldn't say what it was. When pressed, Robotron director Wokurka discussed all the matters on which price might depend -- configuration, memory sign, applications, "negotiations" -- and then said only that it would be "competitive." For the most part, in the iron curtain home countries -- where needs are determined and filled by the state -- price is academic. But in third world countries -- or even in a recalcitrant East Bloc one -- price competition might arise.

In the machine-to-machine comparison, there was no mention of production capability either . . . another way to measure relative technology. Production is geared to demand, said the East Germans, and order-filling lead-time is six months. But only 50 EC-1040s were produced last year, they admitted . . . and it was a CDC source that said, "I'll tell you this, it's not the kind of thing you could mass produce and make a profit on."

The peripheral window

But CDC's intention in demostrating the EC-1040 was not simply to show the gap between East-West computer production . . . but to sound the alarm at its closing. Before 1972 when the Ryad plan was announced, says CDC, U.S. shipments

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of computer mainframes to countries behind the iron curtain were substantial and growing. With Ryad, however, they virtually ceased.

CDC fears the same will happen with computer peripherals. While Soviet CPUs lag their U.S. counterparts in performance by only 3-4 years, peripherals fall as much as ten years behind. And CDC sees that peripherals lag as a golden opportunity for trade . . . claiming there's a $2 billion market for peripheral sales during the next five-year plan.

The biggest problem in tapping that market, claims CDC, is domestic red tape. For instance, complained Norris, Department of Defense naysaying had recently squelched a CDC bid to build a $75 million circuit-board factory in Russia (the French got it instead). Export restrictions and antagonism toward transfer of advanced technology will force the Soviets to catch up on their own, says CDC . . . slamming that "peripherals window" shut within just one to three years.

Technology swap

While the EC-1040 was humming away two floors below -- with CDC's disks and printer on it -- Norris called for a massive technology exchange program with the Soviet Union. "There's not enough money in the world," he said, "to solve all of our problems." If nations cooperated, duplication of effort could be reduced -- leaving all nations better off.

There were three parts to his plan:

- First establish a program for collecting information on the level of technology available from behind the iron curtain and the business opportunities presented by U.S. needs for such technology.

- Change the present adversarial relationship between the U.S. government and business into a partnership -- in somewhat the same manner of other Western countries like France, Japan, and the U.K.

- Establish a definitive plan with specific goals and quantifiable results -- as in the recent grain trade -- for the exchange of technology with the USSR. The swap should be substantial, like $25 billion.

In the computer industry specifically, Soviet ideas and concepts -- which are ahead of the U.S. in some software and design areas -- could be traded for American know-how and products. (Norris discounted the military value of high-technology DP products . . . not mentioning the argument that Soviet technologists preoccupied with disk drives couldn't also be making better bombs.)

But for all of Norris' talk about the necessity and benefits to mankind in a technology exchange program -- "If I haven't convinced you I'm sincere, then I've wasted my time here" -- journalists present were hard-pressed to see any CDC motive other than the selling of hardware. The company has placed 35 computer systems behind the iron curtain over the last 12 years . . . and boasts that it has been told by the Russians that "Control Data personnel have seen more plants and technology in Russia than all other American companies combined."

Whether CDC's motives are profit or conscience, though, Norris had a point when he said, "We tend to make the mistake of evaluating their system on the basis of our own. And we can's do that. We've got to understand their system."

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• THOSE EUROPEAN SOUPED-UP 370/115s AND 125s WILL BE COMING STATESIDE, says IBM . . . first as a field upgrade, later as new processor models (EDP/IR,Oct.24,1975). Faster and more powerful than their predecessors, the 115-II and 125-II will also cost more . . . $1,015 more a month (MAC) for the 115, $675 for the 125.

• AND IBM WILL BE PICKING UP REVENUE FROM ANOTHER SOURCE AS WELL: customers who terminated leases early -- but were not assessed penalty charges because of court orders arising out of the Telex case. Having emerged victorious, IBM now collects. Customers were warned of this possibility when IBM stopped collecting the charges. IBM won't say how many users are involved.

• $11 MILLION WORTH OF TECHNOLOGY TRANSFER HAS BEEN NIPPED IN THE BUD -- by the U.S. Department of Commerce, which nixed IBM's application for export of computer systems to Russia's Intourist. The deal was presumably turned down because the hardware configuration -- a 370/158, a 370/145, 3330s, and terminals -- was just too powerful. The Soviet travel bureau ordered the system in March, 1973, and IBM applied for export license eight months later. Early discussions with the DOC led IBM to reconfigure its original proposed system (dual 370/158s) -- but not to expect rejection of the application. The Giant took the rebuff with no reply except to state that it understood and accepted the decision.

• COPYING XEROX IN A COPIER PATENT SUIT, the Giant has filed suit in Canada and the U.S. over Xerox's alleged infringement of patent rights for a process used in its copier models -- and Xerox Models 4000 and 4500. The IBM suit asks for injunctions against Xerox and an unspecified amount of damages. Xerox says that it has license agreements with IBM covering the matter in the suits which it thus believes is without merit.

The IBM action is the latest in a long series of patent disputes in the copier business . . . but the Giant's first. The first volley was fired by Xerox in 1970 on the day IBM introduced its copier, and a subsequent suit was filed in 1973 when IBM brought out its second model. These cases are in the pretrial stage under the watchful eye of IBM's old acquaintance -- Judge David N. Edelstein. The copier business over which the two companies are tussling has been projected by Arthur D. Little to grow in numbers of units about 10% annually for the next five years . . . building on a current revenue base of $3.3 billion/year.

• USING IT'S OWN 16K-BIT RAM DEVICES, FOUR-PHASE HAS COME OUT WITH THE NP-80, a network processor with up to 256K bytes of main memory. And, says the company, the system can be used to provide up to 270 million bytes of data base storage through direct channel connection of two System IV/70s. Such a network could support up to 64 local display stations. The NP-80 is seen to fall in a hierarchical processing system between local processors -- such as IV/70s -- and the central processor. The NP-80 can communicate with the lower echelons in the network at 9600 baud, with the central processor at 50,000 baud. An NP-80 with 256K bytes of memory, 67 megabytes of disk, and support for one 50,000 baud line and three 9600 baud lines would rent for $1419 on a 42-month lease.

• ONLY SO MANY SHOPPING DAYS LEFT TO GET YOUR CHRISTMAS MICRO KIT, and now Intel has joined Cramer Electronics (EDP/IR,Aug.19,1975) in offering the do-it-yourself packages. Intel's product is built around its popular 8080 CPU chip, and comes with clocks, interfaces, ROMs, RAMs, and all the rest ($350). Another company, called Mits, makes a kit called the Altair 680 . . . pegged on Motorola's 6800. Until December 31, this one will cost $293. After that it goes up to $345.

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"THE GRAY SHEET" DECEMBER 19, 1975 • VOL.11,NO.9 P.J.McGOVERN,PUBLISHER

Japan import liberalization - page 4

BURROUGHS UNVEILS ITS FIRST ROUND OF '800' COMPUTERS
NEW LOGIC CIRCUITRY, DEDICATED I/O PROCESSORS, NEW DISKS FEATURED

As promised, Burroughs Corporation last week took the wraps off the first seven models -- in three separate medium-scale systems -- of its previously announced new '800' family of computers. In addition, the company quietly released a new member of the '700' family . . . a low-end computer that fills the gap between the smallest of the new models and the four-year-old B 2771.

The '800' family, claims Burroughs, will offer medium-scale users from 1.5 to 4 times the throughput of precursor '700's . . . or twice the performance at less cost than IBM 370/125s, 135s, and 145s offered to the same market.

Though the company says the new computers are not designed to replace their '700' counterparts, some most certainly will. Few B 4790s, for instance -- announced a year ago and scheduled for production about now -- are likely to see the light of day . . . users in the queue are being offered a chance to switch to the newer '800's, and Burroughs expects most will. Other product line reshaping is expected to occur as more systems are added to the new family and older products are repriced or downgraded to "as available" status.

And if the Burroughs tradition of being first to the user with new technology holds true for the '800's, certain features of the family should spark considerable interest. For example:

- The logic circuitry -- dubbed Burroughs Current Mode Logic (BCML) -- though unique to Burroughs, is at least superficially similar to Emitter Coupled Logic (ECL). Many see such low-voltage, low-current circuitry as standard in the next round of computers.

- "Data Link Processors" -- small processing units built into the computer's I/O channels themselves. In aggregate, the Data Link Processors form a complete I/O processing subsystem . . . which handles all I/O functions for the CPU and can access memory directly.

- A super-fast head-per-track disk system -- which ranges in capacity from 5.5 to 472 million bytes. With an average access time to data of

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5 milleseconds, the system is four times faster than Burroughs' previous head-per-track disks. More standard removable disk pack drives were also announced with the '800's.

- Software compatibility (object code level) with earlier systems. Many consider such a built-in software bridge to be a user-oriented "must" for any new generation of computers.

Three systems

According to Burroughs, the new family -- designed with extensive multiprogramming capability -- is especially well suited to use in transaction-oriented environments . . . on-line terminal networks, data base management systems, and decentralized data processing nets.

The three basic systems are:

- The B 2800 -- with only one model available so far -- comparable in price and performance to the B 3771.

- The B 3800s -- with three models, one a dual-processor configuration -- closer in price and performance to the smaller members of the B 4700 family than to the forerunner B 3700s.

- The B 4800s -- also with three models, one a dual processing configuration -- containing the same CPU promised with the B 4790s announced last year, but costing less and coming with the new I/O subsystem.

In addition, Burroughs now offers the B 3721 -- a single CPU model without the new I/O subsystem and with a slower CPU and smaller maximum memory than the B 2800. All systems are due for shipments to start next quarter.

BURROUGHS' NEW COMPUTERS

	3721	2830	3830	3831	3832	4840	4841	4842
Basic System								
# of CPUs	1	1	1	1	2	1	1	2
# I/O Subsystems	0	1	1	1	2	1	1	2
"File protect"?	no	opt	no	yes	yes	no	yes	yes
CPU cycle time (ns)	500	333	------	250	-----	------	125	-----
# I/O channels	8-20	8-16	-----	16-40	-----	-----	16-64	-----
I/O MB/second transfer rate	1.5 or 3.0	1.5 or 3.0	------	4.0	-----	------	8.0	-----
$/mo. on 1-yr rent	3170	5880	6460	7435	12280	9290	10265	17235
Memory								
Minimum KB	100	100	100	100	200	200	200	200
Maximum KB	300	500	500	500	1000	1000	1000	2000
Increment KB	50	50	-------	50	-----	------	100	-----
Rental/increment	500	460	-------	500	-----	------	1260	-----

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Power to the micro

Probably the most intriguing feature of the '800' family is the new arrangement for handling I/O . . . "Data Link Processors" (DLPs) with each I/O channel to the CPU. Though the nature of each DLP varies according to the family of devices it serves, each communicates with the CPU or main memory at message level . . . rather than the less efficient byte or word level. The DLPs thus free the CPU for more important tasks than wrangling with I/O.

The '800' computers, though, do not necessarily have to use DLPs -- in fact, not all devices that can hook to a CPU channel have corresponding DLPs -- and can work with '700' style I/O systems. DLPs, however, will funtion only on '800's.

Since DLPs vary according to function, their accompanying logic and buffers will also vary . . . a DLP servicing an 80-column card punch will have an 80-byte buffer, a DLP on a printer will have a 132-byte buffer, and so on. Prices for the DLPs, therefore, can run a gamut of monthly rental from $50 to $500.

And while the DLPs are handling I/O chores, a hardware "memory control" -- lodged in the CPU -- handles any contention between the CPU and the DLPs accessing memory. The '700' computers had such a memory control, too, says Burroughs, but the new DLPs -- by communicating at the message level -- increase its usefulness.

Peripherals, too

If Burroughs tapped a little of tomorrow's technology in the "Data Link Processors," . . . it also further refined more of today's stuff with some notable new peripherals. For instance:

- The new head-per-track disk file with its 5 millesecond access time to data and a data transfer rate of 650KB per second. For a further reduction in effective access time, multiple DLPs can be attached (up to 8) to a disk subsystem for parallel access paths.

- Two new disk pack drives. The first, supplied by CalComp, ranges in capacity from 130 million to 1.04 billion bytes and uses 65MB removable disk packs. The second -- Burroughs-made -- uses 174.4MB disk packs and can store from 346.8 million to 2.8 billion bytes per system. In multiple configurations, the new drives provide '800' computers 10 to 50 times the storage capacity of their predecessors.

- A new Burroughs-made 1500 line per minute train printer, which comes with a standard 48-character set, with 132 print positions per line.

Burroughing ahead

While the seven models presented last week are only a portion of what the company says is yet to follow -- bigger models later in the year, a new small business system this winter -- they form a big and illustrative sample.

Though the '800's probably can't really be called "next generation" computers . . . their advanced circuitry and distributed I/O processors ensure that they offer users more than just "more of the same." And when the bigger models come out -- and whenever IBM unveils its '800' family -- the shape of that "next generation" computer will be a little easier to discern.

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Minimum effect?

JAPANESE 100% IMPORT LIBERALIZATION GOES INTO EFFECT THIS MONTH
FOREIGN SHIPMENTS TOP JAPANESE SHIPMENTS FOR THE FIRST TIME

For over a year now, computer makers to the west -- with names like Fujitsu, Hitachi, and Toshiba -- have been readying for an invasion of sorts to be launced from U.S. shores. Springboard for the invasion is to be Japan's 100% liberalization of computer import restrictions -- set to go into effect this December 25 -- which will make it easier for foreign-made computers to reach Japanese soil, primarily through the elimination of red tape.

In addition, Japan earlier this month ceased its restrictions on the amount of capital share U.S. firms may hold in U.S.-Japanese joint ventures . . . which had been relaxed to 50% a year ago, following pressure from the U.S. government.

But the Christmas date notwithstanding, the trade liberalization may have less immediate effect on Japanese and U.S. mainframers than one might at first expect. This is largely because:

- A large number of Japanese-made new model computers are hitting the streets these days . . . and more will come in the ensuing months. Domestic makers are pushing them vigorously, too.

- The lucrative government sector is expected to stick to its "buy Japanese" policy . . . and a number of large-scale projects in the Ministry of Posts and Telecommunications, Science and Technology Agency, and Patent Office should keep domestic demand well stoked.

- There are still incentives for private industry to buy Japanese-made products -- depreciation and real estate tax breaks, rental through the Japanese Electric Computer Company (JECC), and more.

The trade policy change

Under the current system, importers of computer products -- including mainframes, peripherals, and terminals -- have to undergo a governmental screening process which entails the identification of end users and a justification for the necessity of importing foreign goods. In most cases, after submission of the proper paperwork, the Ministry of International Trade and Industry (MITI) then approves the import . . . the whole process can take over three months.

When an imported product is slated for a market that is over 50% held by foreign goods, however, MITI's scrutiny becomes more rigorous -- and a search is conducted for suitable domestic substitutes.

But with the Christmas liberalization, computer goods will be shifted to an "automatic import" status . . . meaning MITI will automatically approve all import applications, shortening the import process to a week or two.

Lest domestic markets be overrun, however, the watchdog agency will probably try to maintain the "50% rule." The most likely method of control over products in question would be a suspension of current duty rates -- which are temporary lower fees approved to placate the U.S. government -- and a reversion to the original higher rates. Such duties would raise the price of foreign goods in Japan.

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In addition, MITI has drafted guidlines for government and industry to use as "administrative guidance" in buttressing against foreign imports . . . with special long range planning devoted to IBM's next generation of computers. (Hence the recent reorganization of Japanese mainframers' research and development of ultra-LSI -- 64K bits/chip -- circuitry reported in EDP/IR, July 7, 1975.) And MITI often backs up its proposals with money for subsidies.

Capitalization policy change

Sixteen months ago, when the first step in decontrol of foreign capitalization of joint enterprises went into effect, it had minimal impact on the Japanese and U.S. mainframers -- primarily because many U.S. firms had already received dispensation from MITI to own more than the current allowable limits.

IBM Japan and Nippon Memorex were 100% U.S.-owned, for instance; NCR Japan was 72% U.S.-owned; and CDC, Honeywell, and Burroughs Japanese joint companies all 50% owned by the U.S. firms.

And since then only a few new major companies -- like nonmainframers Itel, Comshare, and GE -- have entered into joint capital ventures with the Japanese, generally winding up with less than the allowable 50% control.

But this year's liberalization -- at first glance -- looks different, primarily because of Burroughs' 95% takeover of Takachiho Burroughs, its Japanese marketing arm. But MITI claims it would have given the U.S. company authorization to exceed the old limit anyway. "Burroughs' acquisition of a majority of the shares of Takachiho Burroughs is solely due to a failure in business management by Takachiho Keoki [its Japanese parent company], and it has nothing to do with capital liberalization in the computer industry," said one MITI spokesman.

And rumors persist -- to which Burroughs will issue only a "no comment" -- that Takachiho Keoki will be allowed to buy its share back in five years . . . in other words, Takachiho Keoki will be using its shares in Takachiho Burroughs as collateral on a five-year loan. On its part, Burroughs is downplaying its incursion into Japanese business as much as possible . . . and few observers expect the U.S. company to make any drastic immediate changes.

So perhaps the 100% liberalization isn't such a fearful thing (Japanese computer makers had asked the deadline be pushed back a year) . . . and a U.S. takeover quite so imminent. Time will tell. In the meantime -- if MITI is right and if Takachiho Burroughs is a good example -- an open-door policy may actually help domestic business more than it hurts it.

Even Steven in the market

The reason for Japanese concern, of course, is that country's fast-growing (over 20% a year on the average) market for computers . . . the biggest next to the United States. Currently the installed base is split about 50-50, domestic to foreign-made computers. Naturally the domestic mainframers would like to keep or increase their share . . . and it seems they may have a better chance than, say, domestic computer makers in other non-U.S. countries.

Shipment figures for the last three Japanese fiscal years -- which run from the beginning of April to the end of March -- are shown in the table on page 7. Note that:

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- Shipments to the Japanese market from foreign sources as a percentage of total shipments has been creeping up year by year, surpassing domestic shipments last year for the first time in seven years. Yet,

- The foreign share of installed base has been inching downward year by year because of returns. This, in part, reflects the foreign predominance in the large-scale computer market.

- The weakening economy and the congruence of both IBM and domestic product cycles in Japanese Fiscal 1973 took their toll in both shipments and net gain to the installed base.

Taking the offensive

Another way for the Japanese mainframers to bulwark against foreign imports is through their own exports . . . consequently, marketing on a worldwide scale is becoming more and more a part of corporate strategy. And though the U.S. is the single most attractive marketing target, it's also the most well-covered by its own domestic makers . . . hence early Japanese export thrusts have been primarily directed toward Europe, Australia, and the "Third World" countries. Such exports have tended to center around small business systems and peripherals.

But, that may be changing, as the country's two biggest computer manufacturers seem to be setting out to prove:

- Fujitsu -- the Amdahl financial backer and major production arm -- has been marketing overseas as far back as ten years. Not counting Amdahl machines, its major export countries are Bulgaria, Australia, Brazil and Yugoslavia. But with its new M-190 computer -- similar in technology to the Amdahl 470 -- the company hopes to expand its overseas trade . . . and more vigorously attack the U.S. market.

- Hitachi -- joint producer of the "M" Series of computers with Fujitsu -- has been playing "catch-up ball" in the export trade . . . primarily with the export of peripherals, especially OCR equipment (which it plans to market in the U.S.). Again, the company also hopes to revitalize its export business around its M-180 computer.

Hampering the Japanese exporters are two main problems. The first is money . . . JECC rental arrangements are only available for domestically-used computers. (JECC buys the computers from the mainframers and then leases it to the customer . . . cutting out the huge capital investment needed to maintain a rental base.) The second problem is that many of the Japanese companies have technical and marketing tie-ups with American companies . . . tie-ups which can preclude an effective penetration of the U.S. market.

Looking ahead

Domestically, at least, Japan's computer business should be back on track next year, even with the liberalization. At the fiscal halfway mark (ending September 30) the JECC found that the number of computers it had purchased from the six major domestic mainframers showed an increase of 25% over a corresponding period the year before. Moreover, backlogs at the end of July 1975 were about 20% higher than in July 1974. And, the big government lessor expects that pickup to be sustained through the fiscal year . . . for another 20% or so growth year.

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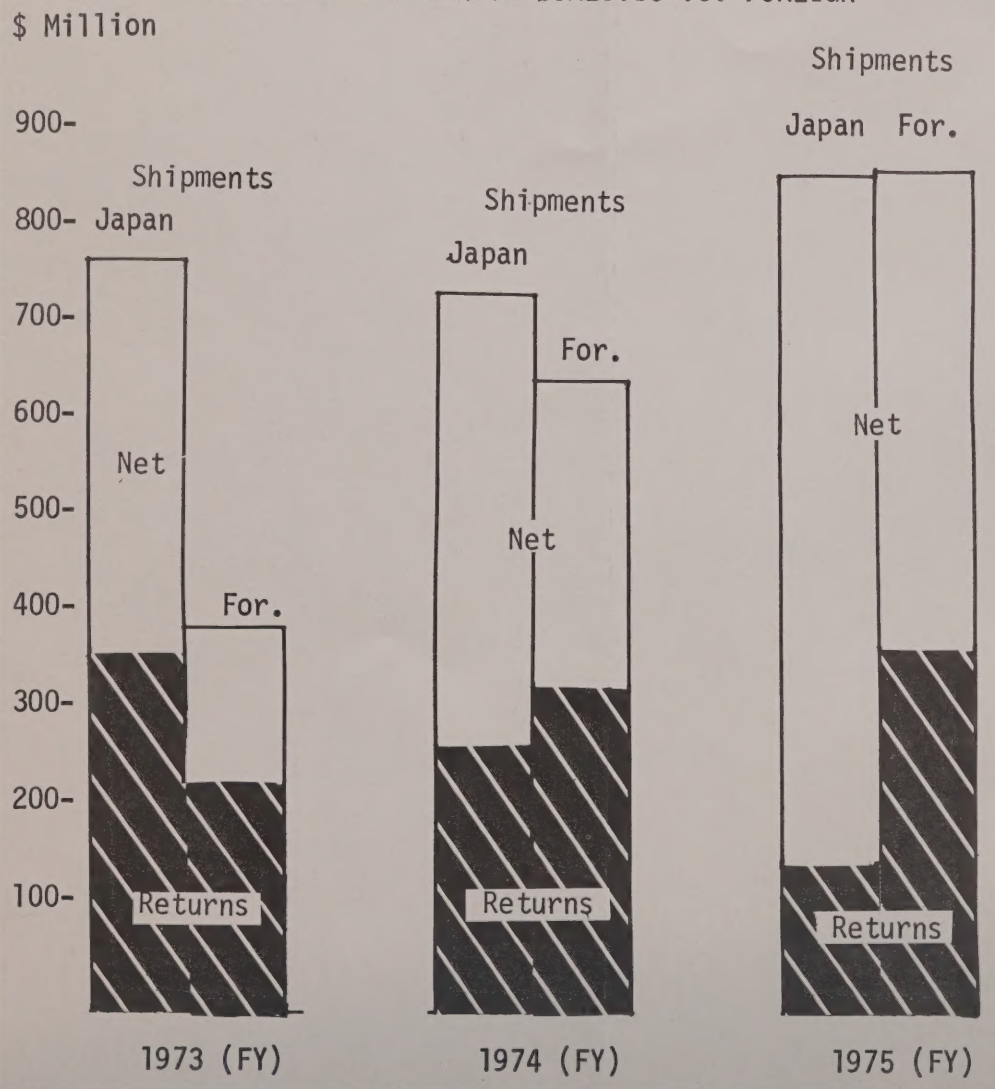
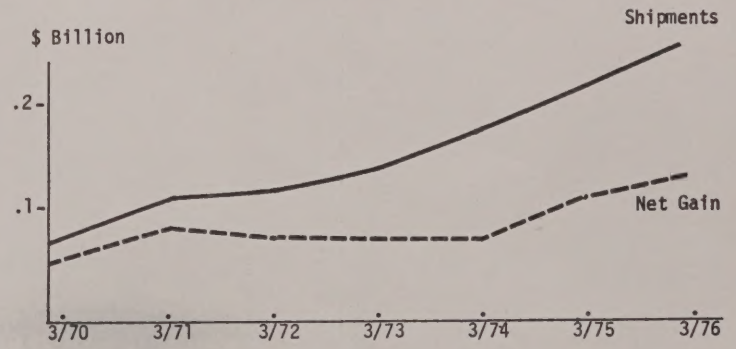
THE JAPANESE COMPUTER MARKET -- INSTALLED BASE, SHIPMENTS, MARKET SHARE

COMPUTER SHIPMENTS: DOMESTIC VS. FOREIGN

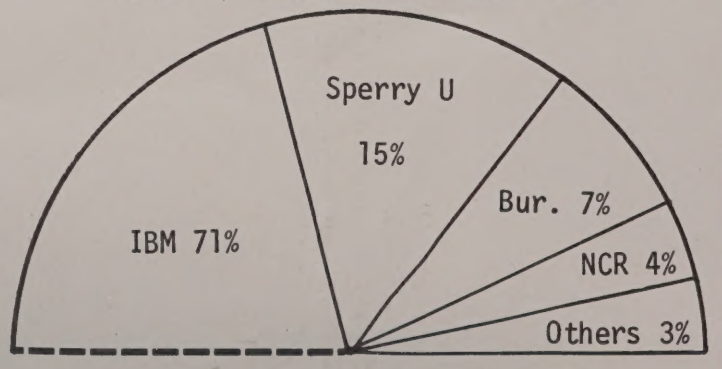


COMPUTER SHIPMENTS AND NET GAIN IN INSTALLED JAPANESE BASE
(3/70-3/75, Actual; 3/75-3-76 Projected)



(Source: EDP Japan Report; "Shipments" includes add-on memory and peripheral upgrades -- worth $451 million in 1975 or 21% of shipments. "Net Gain" counts only changes in CPU base.)

FOREIGN $ SHARE OF INSTALLED BASE



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• IT'S NOT EXACTLY A LEASE, YOU SEE . . . but a "purchase test plan" says IBM, but whatever, it's a new way for customers interested in the IBM 5100 desktop computer to try one out without plunking down the full purchase price. Instead, dollar-wary users can test the 5100 for three months, paying about 15% of the purchase price for the privilege. And an original three-month test can be extended to six months if desired. Industry observers consider the test plan a move on IBM's part to boost the 5100's flagging sales (EDP/IR,Dec.8,1975). Also likely to increase the 5100's attractiveness is a new interface IBM is offering for the computer that will allow attachment of various peripherals -- including instrumentation devices. When the 5100 first came out, competitors had pointed to the lack of such capability as one of the 5100's major drawbacks.

• THE PERILS OF SERVICING LARGE CLIENTS: COMSHARE recently saw its biggest customer cut back on the use of a major application -- worth about $400,000 a quarter to the timesharing company. Revenues for this quarter should still exceed last quarter's, but net earnings will be significantly hit. Comshare won't identify the customer -- still its largest client -- and won't say what it was that supplanted its service . . . except that it wasn't another timesharing outfit.

• DIGITAL COMPUTER CONTROLS HAS A D-116 SUCCESSOR NAMED, which could come in handy if the injunction against D-116 production ever goes into effect (EDP/IR, Nov.24,1975). DCC calls its new computer the Mod Five -- and labels it a fourth generation mini. It comes with any one of three operating systems, high-level language capability, internal cycle times of 1200, 1000, or 800 nanoseconds, microprogramming, and full compatibility with the DCC product line and the Data General Nova 1200. Pricing for the Mod Five is about the same as the DCC D-116.

• SOME NEW TERMINALS ON THE SCENE: first, from Sycor, two ECMA-compatible intelligent data entry terminals. Dubbed the Models 310 and 320, they are designed primarily for use with small business systems. Each has 8K bytes of ROM and firmware programs that automatically control all terminal functions including format programs for specific data entry applications, arithmetic and checking operations and data communications. The models may come with optional randon access memory (RAM) of 3K bytes. The 320 is the same as the 310 with an extra cassette recorder and some automatic data communications functions. The 310 rents for $204 a month on a 1-year contract, the 320 for $239 a month.

Second is a new version of the NCR 279 financial terminal from the Dayton mainframer. Developed for use in commercial banks, savings and loan associations, saving banks, and credit unions, the system can operate standalone or be upgraded to on-line use. In addition to normal NCR 279 functions, the new version has extra totalling functions, activity counters, and communications abilities. The purchase price of the off-line terminal is $2775; it can be upgraded to on-line use for an additional $275 to $500. NCR 279s now in the field can be upgraded to the new version for upwards of $500.

• WITH A DUPLEX IBM 370/195 AS COMPUTING ENGINE, C.I.T. Financial Corporation has completed installation of a nationwide data communications system. The net links 800 locations -- with 13 communications concentrators across the country -- with 45,000 miles of communications lines. The system is capable of storing 1.2 billion characters. C.I.T. expects it to increase efficiency and speed up delivery of financial services to its customers.

• FROM EDP INDUSTRY REPORT AND PUBLISHER IDC: BEST WISHES FOR THE HOLIDAYS.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 31, 1975 • VOL.11,NO.10 P.J.McGOVERN,PUBLISHER

Inside: User Spending -- 1976

IBM, COMSAT, AETNA FILE APPLICATION FOR SATELLITE SYSTEM WITH FCC ROOFTOP ANTENNAE, TRANSMISSION OF VOICE, IMAGE, DATA FEATURED

Three years ago, when IBM exited the computer services business and pledged not to return for six years -- as part of the settlement of CDC's antitrust suit -- the industry wondered aloud just how and when the Giant would come back.

Well, IBM may at last have answered that question last week -- when it filed plans with the FCC for a domestic satellite communications system. Also filing were Comsat General and Aetna Life (EDP/IR,Oct.8,1975), equal partners with IBM in Satellite Business Systems (SBS) . . . the company that will develop, build, and market the proposed new system.

Termed an "advanced digital communications system that will allow each customer with geographically dispersed locations to combine voice, data and image communications into a single, integrated, private-line switched network" . . . the net would use small earth stations located on a customer's premises for the transmission and receipt of signals. Such signals will be carried at higher than normal frequencies . . . which communications industry observers say will represent technology more sophisticated than any in use today.

For users, SBS's services will begin and end at the entrance and exit ports of the earth stations . . . and will be operate with any bit stream, independent of character code, message content, or line protocol. Providing it meets current industry standards, a user's existing equipment may be directly connected . . . or local loops may be established upon request.

While the nature of IBM's proposed system comes as no shock to the telecommunications industry, as a Western Union spokesman asserted . . . still, the reality of IBM's filing has its impact. EDP Industry Report sees it as a signpost to some major changes to come -- in two industries, at that:

- Ma Bell is not involved. Users of the system -- perhaps also users of IBM computers -- will have no need to tie into the Bell System for intra company communications. For inter-company communications, it's conceivable that the IBM system could be used for long haul calls, tieing in to the Bell loop only at the local level.

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- There are ominous implications -- depending on the economics, of course -- for the specialized communications common carriers. The SBS system may do all of what a Datran or MCI can do . . . and more. Users may find such one-stop communications shopping a significant convenience.

- IBM is committed. SBS estimates that $250 million will be required from now through 1979 -- when operations could commence -- and much of that will necessarily go into ensuring the technology is ready when the satellites go up. To get the jump on system development, SBS has asked FCC permission to run a limited "Pre-Operational Program" using lower frequency facilities leased from DOMSAT carriers.

SBS has a way to go, of course, before users are merrily beaming messages to and from their corporate roofs. For one thing, the FCC has to approve the system -- presumably after another round of protests from the other carriers -- and approval isn't automatic. But the FCC did put restraints on the original IBM-Comsat plan -- and the companies did comply . . . .

But besides red tape, the economies also have yet to be proven . . . and this only time, technology, and the marketplace can do.

If the SBS satellites do get off the ground, though, it's likely that users -- courtesy of the mighty resources of IBM, Comsat, and Aetna -- will reap the benefits of another quantum change in communications cost/performance . . . as IBM and AT&T struggle overhead for their communications dollars.

That's then. What the industry, the FCC, and potential SBS competitors will have to ask themselves now is . . . what about the long run? The real long run?

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TRIAL OF THE YEAR . . . OR DECADE?

To observers outside the immediate realm of the computerland, perhaps only one event in the industry connected with the year 1975 will be remembered as important . . . the fact that IBM was finally brought to trial. Even within the industry it's easy to underestimate the magnitude of that feat.

But so far, other than actually starting, little else has happened to offer hope that the trial will also end.

The brouhaha has been intense -- tempers flare often now in the courtroom, a judge has been censured by his appellate court, charges of misconduct on both sides have been levied, the issue of confidentiality has erupted (EDP/IR,Nov.6, 1975) -- but little of a substantive nature has gone on.

The case is still in the first stage of the plaintiff's presentation, and current estimates by the DOJ -- notoriously good at miscalculating deadlines -- indicate that IBM won't even begin its side of the case until early 1977. And how long the Giant will be speaking in its own behalf is yet to be seen. Some say it could be twice as long as the DOJ . . . others say, in view of the government's case to date, it won't have to. Then there's the time the judge will need to mull it all over. After that comes appeal.

Who knows, by the time the final outcome is known, we may first learn of it from our desktop CRT . . . the one connected to the antenna on the roof.

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Preliminary spending survey

MORE REAL SPENDING SEEN FOR 1976 AS INFLATIONARY PRESSURES EASE DEFERRED APPLICATIONS AND BUDGET CUTTING TRENDS REVERSED

Whether by hunch, by optimism, or by honest forecast, just about everyone in the computer industry knows that 1976 will be better than the rocky year just past. But now the first figures are in to verify it. IDC, publisher of EDP/IR, has finished analysing survey results from its representative medium- and large-scale EDP spending panel . . . and the 1976 spending outlook is bright.

Interestingly, percentage increases in spending will be about the same as was actually experienced in 1975 -- but the absence of inflationary pressure will allow increased staffs and hardware additions or upgrades to soak up the dollars -- instead of higher prices to maintain the status quo.

The positive spending signs seen by IDC:

- Budget-cutting is down to a trickle. Last year at this time, 11% of the survey anticipated budget declines . . . this year only 3% do.

- Application development is back on track. Last year fully two-thirds of the sample were deferring new applications and/or limiting staff in response to budget pressure. Now the majority are both implementing new applications and adding to their in-house staffs.

- More CPU upgrades are planned. Almost 30% of those interviewed -- or twice last year's percentage -- see a major CPU upgrade for 1976. Full utilization of current gear is the prime reason . . . but diminished expectations for "fourth generation" equipment are also playing a part.

Overall spending planned by the sample shows an 11% increase over 1975. This is a full percentage point less than the actual gain registered the year before, but analysis indicates real growth will be 9% in hardware spending (up 2%) and between 4% and 5% in staff (up 3-4%). Also, compared to 1975, relatively fewer users are planning really major budget increases . . . most of the large users have already acquired their big ticket hardware for this round, most of the medium users are finding evolutionary ways to implement their TP/DBMS applications.

Hardware spending

As in 1975, the bulk of new hardware acquisitions will continue to evolve around communications and data base applications . . . 31% are planning major terminal acqusitions, 36% are planning major disk capacity enlargements (with a pronounced trend toward the 3350 among IBM users; slower than expected interest in the 3850 Mass Storage System). Communications controllers are seeing an abatement of activity; but the demand for add-on memory and tape drives -- especially the 6250 bpi variety -- remains stable.

CPU acquisitions are also evident -- 31% of the survey sample plan to acquire at least one CPU of the 370/145 size class or above. But some of this activity will occur without a hike in hardware budgets . . . as users continue consolidating and expanding their main computer sites, while replacing computers with terminals at remote sites. Thus, there is still noticeable activity in the 370/158 and 370/168 size classes. In other hardware areas:

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1976 EDP BUDGETS FOR ESTABLISHED U.S. COMPUTER USERS
(Preliminary, Copyright 1975 by International Data Corporation)

Category	% of Total EDP Budget	% Change, '76 vs. '75
Hardware Spending	35% - 40%	
Large Users		+ 6% - 8%
Medium Users		+ 11% - 12%
Salaries	45% - 50%	
Salary Upgrades		+ 7% - 8%
Staff Additions		+ 4% - 5%
Supplies	8% - 10%	+ 4% - 5%
Transmission Facilities	0% - 10%	+ 15% - 20%
Outside Software/Consulting	Neg.	Up Slightly
Outside Services	Neg.	Mixed Pattern
TOTAL BUDGET		
Large Users		up 7.5% - 8.0%
Medium Users		up 12.5% - 13.5%
Weighted Average		up 10.8%

- Plug-compatible peripheral activity should keep pace with 1975, at least among large-scale users (more than half employ PCM gear). Of the vendors, Storage Technology appears to be generating the most interest -- in both tapes and disk.

- Large-scale users are continuing to bring "outside" services in-house, particularly timesharing and COM/fiche services.

- Few shifts loom for 1976 in equipment financing, although third-party leasing remains stronger than one might expect at this end of the 370 product cycle. The effect of IBM's recent rental hikes should be minimal -- as most large-scale users have little equipment on rent.

Other budget items

No doubt because the pressure for whopping salary increases has lessened -- as the economy as a whole is sluggish and unemployment remains high -- projected annual increases are slightly below last year's 8%. The overall amount paid for in-house salaries, though, will increase an additional 4-5% as users expand their staffs. Skilled programmer/analysts in data base/data communications are the most sought after, computer operators next in demand.

Also easing up -- primarily because of a stabilization of the cost of paper-based supplies and in-house conservation measures -- is the "supplies spiral." In 1975 supplies costs increased 25-30% -- compared to a projected 4-5% for 1976.

Spending for telecommunications should increase 15-20% . . . spurred on by the focus on teleprocessing applications. And to Ma Bell's good fortune, IDC located little interest in independent transmission services.

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DEDICATED APPLICATION DIGITAL COMPUTER CENSUS

The data below was compiled from the best information available to International Data Corporation; questions or comments should be referred to Chris Whichard, the Census Editor. Dedicated Application (Group B) computers are those commonly referred to as minicomputers, plus certain larger systems designed primarily for a single application such as process control, data communications, and data entry. Group B computers -- though general purpose by design -- are typically word oriented (8, 12, 16, or 24 bits per word), usually sold outright, and predominantly programmed in machine language. Exceptions in all cases do occur, however . . . and, it seems, more and more often.

Indeed, definition is becoming increasingly difficult, and subjective judgement is necessary. For example, office accounting computers such as Burroughs' E and L Series or TC-500, NCR's 399, Nixdorf's 820, and Singer's 5800 are excluded; Among those included, however, are "data entry" oriented machines such as the Eldorado 140, Four-Phase, and MAI's Basic/Four since they compete with other "minis" yet do not fit EDP/IR's definition of General Purpose (Group A) computers. Another anomaly is IBM's System/32 -- which EDP/IR has classified as a low-end Group A computer.

Price Classes: (1) $25,000 (2) $25-50,000 (3) $50-100,000 (4) $100,000; Average System Value

AS OF JULY 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	NOTES	BITS PER WORD	PRICE CLASS	PURCHASE PRICE ($1,000) BASIC	AVERAGE	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Adage, Inc.	AGT-10 Series			4	100	165	4/68	32	3	35	X
	AGT-100 Series			4	30	37	1/72	21	15	36	X
	300			4	30	37	3/75	14	3	17	5
	400			2	30	37	3/74	10	2	12	3
Apeco (Cascade)	80/20	*	8	2	28	35	1/70	]	]	]	]
	80/30	*	8	2	31	40	1/70	] 215	] 10	] 225	] X
	80/40	*	16	3	46	57	1/70	]	]	]	]
Autonetics	Recomp-II		40	4	95	127	11/68	30	5	35	X
	Recomp-III		40	3	65	94	6/61	7	2	9	X
Bailey Meter	750		25	4	40	110	6/60	38	15	53	X
	755		25	4	80	130	11/61	7	2	9	X
	756		25	4	90	150	2/65	17	12	29	X
	855/15		16	4	24	135	12/72	5	5	10	5
	855/25		25	4	100	400	4/68	16	0	16	X
	855/50		25	4	100	400	3/72	8	0	8	4
	955		16/32	4	250	750	10/75	–	–	–	8
Bendix	BDX-6200		20	3	25	60	5/70	40+	0	40+	NA
	BDX-9000		16	1	6	15	/71	8+	0	8+	NA
Bunker Ramo	130		15	3		90	10/61	160	27	187	X
	133		15	4		108	5/64	79	9	88	X
	230		15	4		134	8/63	15	2	17	X
	300		29	4		275	3/59	18	5	23	X
	330		29	4		275	12/60	19	7	26	X
	340		29	4		375	12/63	19	3	22	X
	1018		18	1		23	12/71	10	2	12	NA
	Subtotal							320	55	375	
Cincinnati Milacron	CIP-2000 Series	a	8	1	4	12	7/69	550	0	550	NA
Clary Data Corp.	404	*	16	2	6	30	1/70	110	22	132	NA
Collins Radio	8311			1	15	17	1/68	NA	NA	NA	NA
	8400			4		950	11/62	25	8	33	X
	8500		32	4	200	1,000	1/67	53	16	69	X
Compiler Systems	CSI-16		16	1	11	20	11/70	90	0	90	NA
Corp.	CSI-24		24	2	15	30	12/70	40	0	40	NA
Computer Automation	108/208/808		8	1	5	11	4/68	280	30	310	X
Inc.	116		16	1	8	16	8/70	175	35	210	NA
	216		16	1	8	20	7/69	330	45	395	X
	816		16	1	10	15	12/68	40	5	45	X
	Alpha-8		8	1	3	4	5/72	] 2,480	] 625	] 3,105	] NA
	Alpha-16		16	1	4	9	10/71	]	]	]	]
	Naked Mini-8		8	1	2	3	5/72	]	]	]	]
	Naked Mini-16		16	1	3	7	10/71	] 3,050	] 610	] 3,660	] NA
	Alpha-LSI		16	1	2		12/73	]	]	]	]
	Other							1,220	360	1,580	NA
	Subtotal							7,595	1,710	9,305	
Computer Development	CD-2000		8	1	7	10	8/70	NA	0	NA	NA
Computer Logic Systems	CLS-18		18	1	9	14	3/71	NA	0	NA	NA
Computer Signal Processors	CSP-30		16	3	35	80	6/70	35	NA	35	10
	MAP		32	1	14	25	6/75	–	–	–	NA
Comtec	CT/90		16	3	50	85	1/72	NA	0	NA	NA
Comten, Inc.	20		16+2	3	35	80	3/71	45	0	45	NA
	40/45		32+4	4	93	240	8/69	34	0	34	NA
	60/65		32+4	4	138	350	9/69	14	0	14	NA
	476		32+4	4	76	280	8/75	–	–	–	NA
	3650		16+2	3	43	90	3/75	16	0	16	NA
	3670		16+2	4	71	150	3/72	125	0	125	NA
Consultronics	600 Series		24	3	31	80	10/65	230	0	230	NA
(Sc. Control Corp.)	4700		16	3	15	72	4/69	18	0	18	NA
	DCT-132		8	2	28	36	5/69	75	65	140	NA
Control Data Corp.	160		12	4	60	112	5/60	49	11	60	X
	160-A		12	4	90	225	7/61	200	65	265	X
	160-G		13	4		535	3/64	34	1	35	X
	924/A		26	4		430	8/61	26	1	27	X
	1700		16+2	4	37	160	3/66	290	180	470	X
	1700-SC		16+2	3	20	60	9/70	150	130	280	X
	System 17		16+2	2	14	39	2/74	65	115	180	NA
	8090		12	3		90	5/64	116	89	205	X
	8092		8	3		67	6/64	56	14	70	X
	G15		29	3		61	7/55	265	30	295	X
	LGP-21		32	2		42	12/62	140	35	175	X
	LGP-30		32	3	49	59	8/56	290	43	333	X
	RPC-4000		32	4	87	101	10/60	61	12	73	X
	CSC-46/136/636		15	4		280	/54	27	3	30	X
	Elbit-100		12	1	6	8	6/67	5	445	450	X
	Cyber 1000/M-1000		24	4	250	365	/68	40	20	60	NA
	Subtotal							1,814	1,194	3,008	
Datacraft Corp.	6024-1		24	4	51	135	5/69	20	0	20	X
(Harris)	6024-3		24	3	32	90	2/70	140	30	170	NA
	6024-4		24	3	24	100	8/73	35	5	40	10
	6024-5		24	2	16	50	5/72	165	5	170	5
	Series 100			3			10/75	–	–	–	NA
	Series 200			4			10/75	–	–	–	NA
	Subtotal							360	40	400	15
Data General Corp.	Nova		16	1	6	13	2/69	750	620	1,370	Neg
	Nova-800		16	1	7	17	3/71	1,300	300	1,600	125
	Nova-820		16	1	6	16	4/72	875	250	1,125	100
	Nova-840		16	2	16	30	7/73	760	220	980	100
	Nova-1200		16	1	5	10	12/70	4,100	1,095	5,195	400
	Nova-1210/1220		16	1	4	10	2/72	3,400	990	4,390	400
	Nova-1230		16	1	7	11	12/71	300	90	390	50
	Supernova		16	1	9	21	4/70	185	85	270	Neg
	Supernova-SC		16	2	17	30	6/71	210	105	315	15
	Nova-2/4		16	1	3	7	10/73	1,320	500	1,820	150
	Nova-2/10		16	1	4	8	10/73	1,080	485	1,565	100
	Nova-3/4		16	1	3	5	1/76	–	–	–	200
	Nova-3/12		16	1	11	17	1/76	–	–	–	150
	Eclipse-S/100		16		9		2/75	25	10	35	150
	Eclipse-S/200		16		16		2/75	20	10	30	100
	Eclipse-S/300							–	–	–	50
	Subtotal							14,325	4,760	19,085	

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AS OF JULY 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	NOTES	BITS PER WORD	PRICE CLASS	PURCHASE PRICE ($1,000) BASIC	AVERAGE	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Datamate Computer Systems	DM-16		16	2	17	26	11/69	12	0	12	X
	DM-70		16	1	9	15	12/70	25+	0	25+	NA
	DM-70/ROM		16	1	4	6	10/70	NA	0	NA	NA
	ECP-18		18	1	14	16	11/66	21	0	21	X
	2400		24+3	1	15			NA	0	NA	NA
Data Technology	1600		8	1	6	22	9/68	NA	0	NA	NA
Digiac Corp.	3060			1	9	13	1/70	90	0	90	NA
	3080		25	1	20	25	12/64	16	0	16	X
	3080-C		25	2	26	37	10/67	8	2	10	X
	3090			1	5		2/74	10	0	10	NA
Digital Computer Controls	D-112		12	1	3	12	8/70	2,325	270	2,595	1,110
	D-116		16	1	3	12	2/72	3,680	470	4,150	
Digital Equipment	PDP-1		18	4	120	136	11/60	35	6	41	X
	PDP-4		18	3		74	8/62	30	3	33	X
	PDP-5		12	2	30	36	9/63	61	29	90	X
	PDP-7		18	3		66	11/64	69	46	115	X
	PDP-8, i,l,s		12	2	8	27	5/65	5,765	3,685	9,450	X
	PDP-8/e,f,m		12	1	4	12	4/71	12,790	6,210	19,000	1,500
	PDP-8/Linc		12	2	38	48	9/66	88	46	134	X
	PDP-9 & 9L		18	2	35	50	12/66	290	160	450	X
	PDP-11-05 & 10		16	1	5/7	12	2/72	7,065	4,285	11,350	1,100
	PDP-15 & 20		16	1	3/11	16	3/70	2,800	1,500	4,300	200
	PDP-35 & 40		16	2	9/13	30	1/73	3,350	1,490	4,840	700
	PDP-45 & 50		16	3	24/32	80	4/72	1,460	540	2,000	350
	PDP-12		12	2	13	45	4/69	505	250	755	Neg
	PDP-15		18	3	15	75	2/70	485	250	735	50
	PDP-8/A						10/74	550	150	700	800
	PDP-11/70						7/75	NA	NA	NA	NA
	LSI-11						6/75	25	10	35	150
	Subtotal							35,368	18,660	54,028	
Digital Scientific Corp.	Meta-4		16	3	29	90	4/70	115	10	125	10
Dynamic Research	DPC-44		24	2		36	7/68	NA	0	NA	NA
Eldorado	140/200	*	8	2	18	30	1/70	390	0	390	25
Electronic Associates Inc.	640		16	3	27	55	6/67	110	61	171	X
	1020		16	1	20	25	2/64	100	25	125	X
	8400		32	4	200	450	6/65	21	8	29	X
	Pacer-100		16	2	15	40	5/72	125	100	225	15
Electronic Processors Inc.	EPI-118		18	1	3	14	11/70	NA	0	NA	NA
	EPI-218		18	1	4	14	1/72	NA	0	NA	NA
EMR	210		12	4	94	132	4/62	9	0	9	X
	420		42	4	324	450	6/63	3	0	3	X
	2100		21	4	65	143	12/63	8	0	8	X
Foto-Mem, Inc.	Centaur-100		8	1	6	20	4/70	25	0	25	NA
Four-Phase Systems	IV/40		24	3	16	55	6/73	1,250	250	1,500	NA
	IV/70	*	24	3	16	60	3/71				
Foxboro	Fox-1		24	4	95	260	10/72	NA	NA	NA	NA
	2/10		16	2	30	50	11/72	NA	NA	NA	NA
	2/20		16	3	50	100	9/72	NA	NA	NA	NA
General Automation Inc.	GA-18/30		16	2	18	50	7/69	600	130	730	Neg
	SPC-12		8	1	4	16	1/68	3,425	825	4,250	100
	SPC-16		16	1	8	25	5/70	5,150	700	5,850	500
	16/110		16	1	1	–	12/75	–	–	–	NA
	16/220		16	1	2	–	1/76	–	–	–	NA
	16/330		16	1	3	–	1/76	–	–	–	NA
	16/440		16	1	6	–	7/75	–	–	–	NA
GE/PAC	30	b	8	1	7	35	5/69	225	50	275	NA
	312		20	4		200	3/60	27	6	33	X
	412		20	4		300	7/62	39	8	47	X
	3010	c	16	3	13	90	5/70	25	1	26	X
	3010/2	d	16	4	13	140	12/71	NA	NA	NA	NA
	4010		24	4	76	200	10/70	33	5	38	NA
	4020		24	4	79	250	2/67	200	60	260	X
	4040		24	4		120	8/64	45	20	65	X
	4050		24	4		280	12/66	23	3	26	X
	4060		24	4		340	6/65	18	6	24	X
	4070		24	4	300	1,000		NA	NA	NA	NA
	4401		24	4		235	9/74	NA	NA	NA	NA
	4402		24	4		500		NA	NA	NA	NA
	Subtotal							635	159	794	
GRI Computer	909 Series		16	1	4	9	1/70	395	75	470	25
	99/30		16	1	5	15	6/72	450	85	535	75
	99/40		16	1	6	17	6/72	140	25	165	25
GT&E (Tempo)	I		16	2	14	36	1/70	100	20	120	NA
	II		16	1	6	10	6/72	60	0	60	NA
	IS-7000		16	1	8	15	6/72	NA	NA	NA	NA
Hewlett-Packard	2107-A	e	16	2	20	40	8/68	10	10	20	X
	2100-A		16	1	7	15	6/71	6,500	2,625	9,125	700
	2100-S		16	2	16	35	8/73	1,000	770	1,770	350
	2114-A		16	1	10	16	5/68	505	310	815	X
	2114-B		16	1	9	15	10/68	530	185	715	X
	2115-A		16	2	15	26	11/67	240	100	340	X
	2116-A		16	2	22	32	11/66	265	200	465	X
	2116-B		16	2	24	40	8/68	450	255	705	X
	2116-C		16	2	20	45	11/69	505	93	600	X
	21-MX							450	225	675	100
	3000		16	4	100	185	11/72	100	30	130	30
	Subtotal							10,555	4,805	15,360	
Honeywell	19		19	4		140	5/61	3	0	3	X
	21		20	3		63	2/66	41	25	66	X
	24		24	4		200	5/63	82	3	85	X
	112		12	1	5	10	11/69	222	48	270	X
	116		16	3		65	4/68	172	35	207	X
	124		24	4	65	130	3/66	109	18	127	X
	224		24	4	75	380	3/65	55	8	63	X
	290		18	4		175	11/60	10	2	12	X
	316		16	2	8	45	6/69	1,450	565	2,015	X
	324		24	4	175	250	7/68	12	0	12	X
	416		16	2	17	43	4/67	198	130	328	X
	516		16	3	24	95	10/66	865	285	1,150	X
	632		32	4	97	450	12/68	10	4	14	X
	700 Series		16	3	16	53	6/72	1,740	615	2,355	350
	164X Series	g	16	4	144	440	12/69	20	8	28	X
	Subtotal							4,989	1,746	6,735	
IBM	1710/1720		6	4		225	2/62	8	10	18	X
	1800		16+2	4	47	235	2/66	550	380	930	X
	System/7		16	3	17	60	11/71	4,855	1,395	6,250	1,000
Imlac	PDS-1	h	16	1	10	11	2/70	NA	NA	NA	NA
	PDS-4	h	16	1	17	21	12/73	NA	NA	NA	NA
Information Technology, Inc.	4900/5		8	1	3	5	10/70	NA	0	NA	NA
	4900/10		16	1	10	20	10/65	25	0	25	X
	4900/20		12/32	2	30	50	10/69	20+	0	20+	X
Infotronics	Mini/Maxi		16	1		25	7/70	NA	0	NA	NA
Interdata	1		8	1	4	11	9/70	235	85	320	X
	2		16	1	11	14	7/68	20	0	20	X
	3		16	1	13	20	5/67	200	5	205	X
	4		16	1	9	21	8/68	300	125	425	X
	5		16	1	11	25	11/70	80	20	100	X
	15		16	2	22	35	9/69	40	24	64	X
	16/18		16	2	15	30	8/71	3	13	16	X
	50		16+1	1	7	19	4/72	110	30	140	20
	55		16+1	2	16	40	8/72	85	25	110	20
	70		16	3	9	65	12/71	840	215	1,055	150
	74		16	2	3	34	2/75	285	57	342	65
	80		16	2	15	44	7/72	70	20	90	15
	85		16	3	23	60	7/73	40	8	48	15
	7/16		16	2	3	35	2/74	370	60	430	150
	7/32		16	3	10	73	7/74	150	25	175	50
	8/32							10	0	10	20
	6/16		16	1	2		1/76	–	–	–	NA
Interplex	System-1		16	2		47	9/70	NA	0	NA	NA
Keane Associates	System/4			3		65	11/71	150	0	150+	NA
Linolex	Model A	*	8	2	10	30	8/72	75	0	75+	NA

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Lockheed Electronics	MAC-16		16	1	11	22	3/69	315	35	350	X
	MAC-Jr		16	1	8	16	1/71	1,250	235	1,485	50
	Sue-IIIX		16	1	6	10	9/72	550	95	645	50
	Sys-III-1		16	2	42	50	1/73	300	25	325	NA
	Sys-III-2		16	3	61	70	1/75	40	5	45	NA
	Sys-III-3		16	3	84	90	7/75	-	-	-	NA
	Subtotal							2,455	395	2,850	
MAI - Basic/Four	Basic/Four	*	8	2	34	46	8/71	925	775	1,700	300
Memorex	MRX-40	*	16	4	91	180	8/72	18	18	36	X
	MRX-50	*	16	4	104	250	8/72	8	12	20	X
Microdata Corp.	400 Series		8	1	3	4	1/70	155	0	155	X
	800 Series		8	1	6	11	5/69	2,055	1,380	3,435	X
	1600 Series		8	1	5	11	2/72	3,500	675	4,175	350
	3200 Series		16	1	8	14	3/74	60	25	85	40
	Micro-1		8	1	1	3	11/74	401	50	451	400
	Subtotal							6,171	2,130	8,301	
Mini Comp	Administrator-2		16	3	35	52	12/70	NA	0	NA	NA
	MD-708		8	1	5	7	8/70	50	0	50	NA
	Multi User-E		16	3	67	85	11/70	NA	0	NA	NA
	Multi User-I		16	3	40	58	1/71	NA	0	NA	NA
Modular Computer Systems	Modcomp-I		16	1	2	9	10/71	650	0	650	NA
	Modcomp-II		16	1	4	22	3/71	450	0	450	NA
	Modcomp-III		16	2	13	44	12/70	120	0	120	NA
	Modcomp-IV		16/32	3	19	89	5/74	100	0	100	NA
	Subtotal							1,320	0	1,320	
Monroe	XI	*	32	2	21	28	5/60	250	200	450	X
Motorola Comm.	MDP-1000		8	1	8	19	2/69	75	0	75+	X
Div.	MC-6800		8	1	5			NA	0	NA	NA
Nanodata	QM-1		18	4	75	150	/73	NA	0	NA	NA
Nuclear Data, Inc.	ND-812		12	1	7	15	3/71	515	10	525	NA
Omnicomp Computer Corp.	Omnus-1		16	1	8	12	8/71	NA	0	NA	NA
Omnitec (BIT)	480		8	1	6	17	12/66	195	3	198	X
	483		8	2	9	33	1/70	115+	40	155+	NA
Philips	P-850 Series	*	16	1	3	15	4/71	200	NA	200	NA
Prime	100		16	1	4	6	4/73	185	85	270	NA
	200		16	1	6	18	11/72	100	50	150	NA
	300		16	3	12	63	9/73	80	25	105	NA
Qantel Corp.	Quantel-V	*	8	2	14	30	6/70	75	0	75	NA
	Answer	*	8	2	12	27	5/72	110	0	110	NA
	S-1100	i	8	2	30	35	1/74	55	2	57	NA
	S-1200	i	8	2	34	42	1/74	75	12	87	10
	S-800	i	8	1	19	19	6/75	4	0	4	3
	S-900	i	8	2	25	32	6/75	4	2	6	10
Raytheon Data	703		16	1	13	23	10/66	179	33	212	X
	704		16	1	10	18	3/70	675	200	875	NA
	706		16	2	19	30	5/69	75	17	92	X
	PB-250		22	2	33	48	12/60	115	20	135	X
	PB-440		24	4		140	3/64	20	2	22	X
	PB-520		24	4		128	10/65	26	1	27	X
	RDS-500		16	1	8	14	12/73	75	25	100	NA
	Subtotal							1,165	298	1,463	
Redcor Corp.	RC-70		16+2	2	15	30	7/68	125	15	140	X
Rolm Corp.	1601	j	16	2	13	28	3/70	980	120	1,100	NA
	1602	j	16	3	18	35	2/73	175	25	200	NA
	1603	j	16	2	13	25	10/74	15	5	20	NA
Sanders	Series-200		16+2	4	57	120	3/69	NA	NA	NA	X
	Series-800		16				12/71	NA	NA	NA	NA
	MIP-16		16	2	15	30		NA	NA	NA	NA
Spear	Microlinc		12	3	46	57	6/66	33	3	36	X
Spiras Systems/USM	65		16	2	19	40	8/69	25	2	27+	X
Systems Computer Corp.	500		8				6/72	NA	0	NA	NA
	1000		8	1	4		1/71	600	0	600	NA
	1500		8				6/72	NA	0	NA	NA
Sys. Engineering Labs.	810		16	2	38	45	9/65	25	6	30	X
	810-A		16	3	18	90	4/67	236	10	246	X
	810-B		18	4	30	150	12/68	168	10	178	X
	840		24	3	65	80	11/65	3	0	3	X
	840-A		24	3	60	75	8/66	36	4	40	X
	840-MP		24	4	49	260	12/67	33	0	33	X
	85		32	4	150	240	7/72	25	5	30	NA
	86		32	4	200	325	6/70	50	6	56	NA
	88		32	4	350	600	3/71	6	2	8	NA
	32		32	3	25	70	8/75	-	-	-	NA
	Subtotal							581	43	624	
Tenet	210		32	4	200	385	8/71	NA	0	NA	NA
Texas Instruments	960-A&B		16	2	14	30	6/70	2,800	0	2,800	NA
	980-A&B		16	2	17	40	5/68	3,200	0	3,200	NA
	990/6		16	1	2		3/76	-	-	-	NA
	990/10		16	1	3		3/76	-	-	-	NA
Unicom Inc.	CP-8A		8	1	3		2/70	140	20	160	NA
	CP-8B		8	1	3		3/70	93	15	108	NA
	CP-8C		8	1	5		3/70	170	30	200	NA
	CP-8D		8	1	7		4/70	35	5	40	NA
	Subtotal							438	70	508	
Unicomp Inc.	Comp-16		16	2	11	29	6/70	26	0	26	X
	Comp-18		18	2	12	38	8/70	38	0	38	X
Univac (EMR)	6130/6135		16+2	4	85	200	3/66	60	38	98	X
	6140/6145		16	4	60	120	6/72	NA	NA	NA	NA
	6020		24	4	72	175	4/65	13	3	16	X
	6040		24	4	98	225	7/65	9	1	10	X
	6050		24	4	123	360	2/66	17	6	23	X
	6070		24	4	240	600	10/65	1	3	4	X
Varian	520/i		16	1	6	13	9/68	350	150	500	X
	620/a		16	3		75	12/65	135	15	150	X
	620/f		17+1	1	11	25	6/70	210	40	250	X
	620/f-100		16	1	10	22	6/72	300	65	365	NA
	620/i		16+2	1	10	20	12/65	1,220	80	1,300	X
	620/L & 100c		16	1	5	12	2/71	730	210	940	NA
	620/L-100		16	1	6	14	6/72	650	185	835	NA
	R-620 * 622/i		16+2	2	15	29	6/69	180	20	200	X
	V-72				10		2/74	200	35	235	NA
	V-73						11/72	400	160	560	NA
	V-74			3	40		5/74	50	10	60	NA
	V-75							25	10	35	NA
	V-76							NA	NA	NA	NA
	Subtotal							4,450	980	5,430	
Varisystems	PAC-16	k	16	1	4		9/69	20	0	20+	X
Wang Labs	3330 Basic		8	2	14	40	4/71	80	0	80+	NA
	WCS/10		8	1	5.7	8.5	4/75	-	-	-	NA
	WCS/20		8	1	10	15	4/75	-	-	-	NA
	WCS/30		8	2	29.1	32	4/75	-	-	-	NA
Westinghouse	P-50		14	1	16	23	8/64	203	19	222	X
	P-250	l	16	3	40	62	9/67	58	10	68	X
	P-500 Series		18	4	85	110	6/63	39	6	45	X
	P-2000		16	2	10	27	8/69	157	44	201+	NA
	2500		16	2	10	30	11/71	135	20	155+	NA
	Subtotal							592	99	691	NA
Xerox	92		12	3		90	4/65	40	10	50	X
	910		24	4		120	8/62	170	10	180	X
	920		24	4		150	9/62	110	20	130	X
	925		24	4		200	12/64	10	4	14	X
	930		24	4	80	400	6/64	100	25	125	X
	CE-16 & A		16	1	8	23	6/69	40	5	45	X
	CF-16 & A	m	16	1	8	17	11/70	93	7	100	Neg
	Sigma-2		16	4	24	125	12/66	210	40	250	X
	Sigma-3		16	4	28	140	1/70	225	85	310	NA
	Subtotal							998	206	1,204	
XLO	Eight		8	1	4		1/71	50+	0	50+	NA
TOTALS								134,440	44,523	178,963	

* primarily sold as "small business computer" and/or "intelligent terminal/data entry"
a. cross-licensed version of Microdata-800
b. cross-licensed version of Interdata-1
c. cross-licensed version of Interdata-4
d. cross-licensed version of Interdata-70
e. utilizes 2115-A or B (Educ. Basic Systems)
f. excluding 2000 and 2007 "system" configurations avoid double counting
g. utilizes two H-316s
h. interactive graphics display systems (freestanding or remote)
i. sold as standalone mini-based business system and as part of larger distributed processing network
j. software compatible with Data General/Nova
k. manufactured by Photon, Inc.
l. utilizes Xerox - Sigma-2
m. utilizes CAI-116

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• HONEYWELL AND CII OFFICIALLY TIED THE KNOT LAST WEEK in their long-awaited merger. Honeywell's European interests will now lie within the new subsidiary, to be called Compagnie Internationale pour l'Informatique-Honeywell Bull (CII-HB). The merger is along the lines expected (EDP/IR,Oct.24,1975). . . Honeywell will have a 47% interest and the French a 53% interest.

Besides strengthening its marketing position in Europe, Honeywell will also get about $58 million in cash for its share of equity in Honeywell Bull. In addition, the new company has been promised $280 million in governement subsidies over the next four years to help offset the cost of the merger. The governement is also a shareholder in CII-HB as a result of holdings in Honeywell Bull.

Guidance in unifying the product line of CII-HB is expected to come from a five-member Technical Committee -- three from Honeywell and two from CII-HB -- which will recommend worldwide product strategy, product plans, research and development budgets and introduction of new products. Interestingly, membership on this steering committee depends not on interets in CII-HB -- but on comparative annual operating revenues of HIS and CII-HB. Both companies -- HIS and CII-HB -- are free to manufacture any product in the common line . . . with decisions on the economic feasiblity of local production coming from the respective managements.

(As part of the agreement, HIS will remain in the timesharing business through a new company, called HB Network Information Services, organized out of the assets and personnel of Honeywell Bull. HIS will own 51% of this company, Compagnie Machines Bull will own 49%.) CII-HB is expected to have approximately 20,000 employees -- three fourth from Honeywell Bull. One of them will be its President, Jean-Pierre Brule, former head of Honeywell Bull.

• THE LITTLE AND THE BIG FROM TEXAS INSTRUMENTS hit the news this month in two separate announcements. The "big" in this case refers to its giant Advanced Scientific Computer (ASC) currently domiciled in Holland. TI says it now wants to bring it home -- to pair it with a similar ASC in Austin in serving the worldwide seismic data processing market. That will make a total of four ASCs based in that Texas city serving the seismic market. The machines will still service TI's European customers remotely -- a feat made possible by a "recent deployment of a TI-developed system that more than doubles the effective rate of data transmission by satellite" . . . using TI minicomputers.

In the "small" category, Texas Instruments announced that the Smithsonian Museum has accepted the first miniature electronic calculator -- invented by TI engineers in the mid-60's and patented in June 1974 -- for its permanent collection. The semiconductor company also presented the museum with the original "calculator-on-a-chip" integrated circuit. If anyone doubts the Smithsonian's astuteness in its judgement of historical significance . . . he need only talk to any of the Christmas shoppers who thronged the calculator sales desks at department stores this year.

• SATELLITE TRANSMISSION IS ONLY ONE WAY TO GO, SAYS BELL LABS, which will soon be testing on a significant scale the transmission of information through fiber-optic cables. According to a Bell spokesman at the National Telecommunications Conference in New Orleans this month, lightwave communications systems have a greater message carrying capacity, are potentially less costly, and are less dependent on valuable natural resources (like copper) than wire or cable transmission facilities. Bell will be evaluating such lightwave transmission for use between Bell Telephone metro switching offices. It's no lightpipe dream.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JANUARY 15, 1976 • VOL.11,NO.11 P.J.McGOVERN,PUBLISHER

Virtual machine?

DEC TIES MINIS AND LARGE COMPUTERS TOGETHER WITH THE DECSYSTEM-20 ARPANET OPERATING SYSTEM, VIRTUAL MEMORY, REMOTE DIAGNOSTICS FEATURED

Maneuvering in a conscious effort to fill the gap in its product line between the largest of its minis and the smallest of its general-purpose computers, Digital Equipment Corporation -- in a building once owned by RCA -- this week uncloaked a younger-brother version of its powerful DECsystem-10.

With much the same hardware as that in the DECsystem-1080 introduced a year ago -- but powered by a new yet proven operating system -- the DECsystem-2040 provides the minicomputer leader with:

- Another timesharing entry in the medium-scale class of general-purpose (Group A) computers. DEC claims IBM 370/145 computing performance for its new system -- at 370/115 prices.

- An upward path out of miniland for PDP-11 users. Though machine architecture differs, the 2040 will be high-level language compatible . . . and compatible via simulation at machine or assembler level.

- A showcase for new technology and a wedge into markets left untapped by the DECsytem-10 because of its higher price.

- A timesharing alternative for users migrating from traditional batch processing to something more interactive or transaction-driven . . . who still need a healthy batch capability.

Like any new product the system is intriguing technically. But, considering the traditional "we-make-iron" nature of its maker, it's also interesting from a nontechnical standpoint. For one thing, hardware and software seem to have been designed hand-in-glove. For another, marketing considerations appear to have affected the system's development right from the start . . . system capability was deliberately throttled so the new product would have the right average system price . . . somewhere between $275,000 and $350,000.

Or as one DECperson quipped to EDP/IR, "According to our salesmen, at least, there's a whole slew of users out there clutching little quarter-million dollar bundles and eyeing our DEC-10s. These are the guys we built this for."

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For DEC, therefore, the new system represents more than just what it calls a "bridge" in its discontinuous product line . . . it's also a "bridge" to the future, with other DECsystem-20 models sure to come along later.

And in an age rife with mainframe dropouts, the 2040 is a sign of the minimaker's continued commitment to its few large systems . . . which comprise, says the company, a steady 15% of its business. It also means a stronger foothold in the company's traditional niche in educational, governmental, scientific, and business computing markets . . . a niche the company expects eventually to absorb at least 1000 of the new systems, the first of which will be delivered next month.

New wrinkles

"What you really want to do in a new product," asserted a DEC speaker at the press conference, "is give them new hardware, but old softtware. Tried-and-true stuff." To that end, the DECsystem-2040 is a blend of old and new. Some of its more interesting features:

+ A CPU which uses emitter-coupled logic (ECL) yet houses an integral core memory (cheaper to make, says DEC) up to 256K 36-bit words.

+ Integrated controllers for mass storage devices.

+ A built-in PDP/11, handling diagnostic and start-up procedures plus controlling data communications and slow-speed peripherals.

+ Virtual memory, with mapping hardware to handle demand paging and save on system resources and core space normally used in virtual operations.

+ Virtual machine operation, where only a certain amount of operating system microcode is bootstrapped in from mass storage during start-up . . . the rest called in only as needed.

+ CPU monitoring of its monitor, the PDP-11, with automatic start-up of either machine from the other in case of a crash. If both systems go down, start-up can be initiated from any terminal.

But the real newness of the DECsystem-2040 may lie in its operating system -- the "tried-and-true" part -- called TOPS-20. And here it seems DEC may have pulled a real coup on the competition . . . the kernel of TOPS-20 is the same operating system in the Defense Department's ARPANET.

Called TENEX and developed under government contract by Bolt Beranek and Newman Inc., it provides for the networking of multifarious computers located in Europe, Continental U.S., and Hawaii. Computing on the sophisticated net is performed by computers carrying nameplates from virtually all the major mainframers . . . with 25 PDP-10s interconnected as the net's communications heart.

With such close association with TENEX (17 DECsystem-10s run on it now), DEC was well positioned to turn it into TOPS-20 . . . and, in fact, paid BBN an undisclosed sum to do so. Ironically, one of the finishing touches left off the 2040 and promised for later release is data communications.

With this advanced operating system, says DEC, come a spate of software improvements. All higher-level programming languages are supported, as well as the

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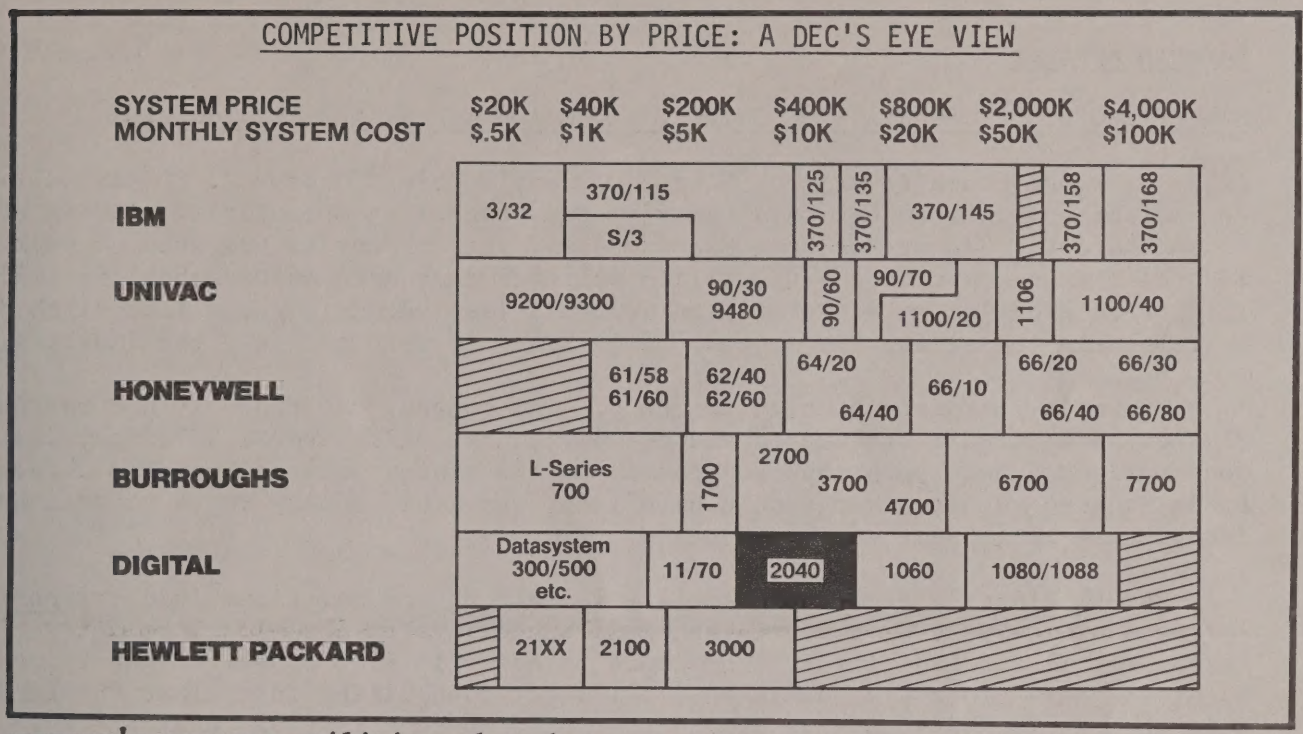

company's program utilities, data base management systems, etc. A new and simplified job control language is offered -- the same for batch as interactive operations. In the case of a system crash, error recovery techniques will allow most interrupted jobs to continue where they left off.

And DEC foresees immediate savings to users (and its own service departments) in maintenance and downtime . . . the automatic diagnostics provided by the front-end PDP-11 can be initiated via remote dialup. Service personnel can even perform long-distance tests while the system is running . . . bringing only the necessary replacement parts when they come.

Market approach

Will DEC's new system compete with IBM? Other than the extent to which anybody in data processing competes with IBM, no, says DEC. In fact, DEC's traditional competitor in the large, timesharing market used to be Xerox. And a new one to look for, says the company, is Hewlett-Packard with its HP 3000 supermini.

While DEC's large system penetration of the overall computer market is miniscule -- 475 installations worldwide worth $300 million, or less than 1% of Group A general-purpose computers according to International Data Corporation -- its reputation in the interactive, timesharing market is good. And, as DEC is careful to point out, the new system's price will make it attractive to a whole new bunch of users. About two-thirds of the world's computer users fall into the size brackets DEC plans to woo with the 2040 (Size Class 2 and 3 by IDC definitions -- see page 6). And these users account for almost 20% of the value of all general-purpose computers made by U.S. manufacturers and installed worldwide.

But IDC also predicts that the dollar percentage will wane as 1980 rolls near, down to 13%. So if DEC's large systems are to hold their own in bringing home the bacon, the company will either have to displace more of its competitors' systems . . . or keep bringing out more products. All of which takes money, commitment, and doing one thing well.

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Scratch another

SINGER DROPS OUT OF DATA PROCESSING . . . AGAIN THE STAKES ARE TOO HIGH

After only one month in office, Singer Company's chief, Joseph B. Flavin pulled the curtain on yet another mainframer's data processing operations. And in order to amputate its Singer Business Machines arm, the company is prepared to swallow $325 million -- part of a $400 million writeoff announced on December 29, 1975. This is in addition to a $26 million writeoff last autumn . . . a last ditch effort to turn the ailing SBM around. Only RCA paid more to leave the industry.

Singer's immediate problem is money. The company has recently had to reshuffle revolving credit agreements and cut dividends, sell diverse holdings, and shut down various other operations peripheral to its sewing machine business . . . a business some say it never should have left. Now the company wants to sell SBM for cash -- if a buyer can be found.

Though Singer's demise will be little felt by the mainframe industry per se -- there are only 2000 or so of the small Singer System-10s out there after all -- to the retail POS industry it looms much larger. In 1963 Singer bought Friden to enter the data processing business . . . later catapulting into clear POS leadership when it landed a massive order from Sears Roebuck for POS terminals . . . a whole 36,000 of them. But that was the good old days. More recently, SBM has lost $60 million for Singer, according to one source, in spite of an $8 million profit in 1963. The company admits its losses in electronics "were mushrooming."

In fact, that Sears order may have been an albatross in disguise. Singer, say some, priced its POS equipment too low in order to land the order . . . and then found itself production-strapped when Sears demanded prompt delivery.

Besides that, say others, Singer may have had too little technological expertise to keep up in the fast-paced POS realm, SBM's management was less than visionary, and -- perhaps most important in the long run -- Singer lacked the marketing prowess to penetrate NCR's cash register base. In other words, Singer may not have ever understood the business . . . and after thirteen years, found out.

Surviving the Singer POS exit -- and the RCA, Motorola, Pitney Bowes-Alpex and MSI Data Corporation dropouts before that -- are a hearty handful of suppliers. NCR is at the top of the heap, and General Instrument is now a healthy second. TRW and Sweda are also in the picture . . . but it's the IBM presence that has most suppliers unconsciously glancing back over their shoulders. At the moment, the Giant's not so big in POS . . . only 1500 of 138,000 general merchandise POS terminals installed in the U.S. at YE 1975 were IBM's. (NCR accounts for 35,000, General Instrument 22,000, and Singer a hefty 60,000.) But IBM is making ominous noises back there. "I get the feeling," says one industry source, "that NCR views IBM as the toughest competitor . . . ."

Also surviving the Singer POS exit are a hearty handful of lawyers . . . doing business these days in Judge David N. Edelstein's New York Courtroom in the IBM antitrust trial. And both sides have already indicated plans to examine the whys and wherefores of Singer's farewell. It should be an interesting autopsy.

It's possible, in fact, that Singer's travails in the POS industry -- which some might argue is a microcosm of the computer industry ten years ago, without the heavy IBM presence -- will be illuminating. Meanwhile, SBM is on the block.

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GSD flurry

IBM SPRUCES ITS LOW END: A NEW S/3, S/32 ENHANCEMENTS, DATA COLLECTION SYSTEM

On the same day that Digital Equipment Corporation was reaching into the higher realms of computing with its DECsystem-2040, industry leader IBM announced new tools for prying into the low end. In all, it was quite a flurry from the company's General Systems Division based in Atlanta. Announced were:

- A new model of the System/3 -- the Model 4. With it comes 64K bytes of MOS memory, a 5 MB or 10 MB disk, capability of running up to four programs at once and the handling of up to five local visual display work stations (3277) and/or printers (3200).

- A new data collection system -- the IBM 5230. Designed primarily for use with a System/3 or System/32, the system offers three models of controller, data entry stations that accept card, badge, or keyed information, and time clocks that accept card or badge. Depending on configuration, a 5230 system rents for $445 to $1765 a month.

- New models of System/32 -- with 13.7 MB disks instead of 5 or 10 MB -- along with the addition of punched card I/O capability. Rental prices for the five submodels with 13.7 MB disks run from $990 a month up to $1242 under MAC, purchase prices run from $39K to $44K.

- Two new IAP's for the System/32 -- one for support of the 5230 Data Collection System described above, one for wholesalers and retailers in the lumber and building materials business.

Another gap bridged?

While IBM has designated the new small business system just announced as a member of the System/3 family, in a way it's a different breed of cat . . . primarily because of price performance. For instance, while a System/3 Mod 4 CPU with 64K memory (only one size is offered) costs $600 a month under MAC, an older System/3 Mod 6 with only 8K bytes costs $674. The Mod 8 with 64 KB -- the smallest System/3 with that much available memory -- costs 65% more than the Mod 4 CPU.

A minimum System/32, on the other hand, costs $840 a month under a 1-year lease . . . and includes a 5 MB disk, 40 cps printer, floppy disk, keyboard, and mandatory 16K bytes of semiconductor memory.

Still, the Model 4 CPU has the same performance specs as its companion System/3s. At the same time, the capability of attaching multiple work stations to the system -- the Model 6 can only handle one direct work station attachment -- offers users a method of better distributing the system's processing power. Telecommunications can be handled through an optional bisnch adapter.

While some of the price difference may be attributable to the dropping cost of memory . . . some may well be a result of increasing competitiveness on the part of GSD. With the Model 4's price and on-line features, the division should find itself reaching into markets previously too lean for System/3 blood. It's even possible, who knows, that here IBM may face a different type of competitor . . . perhaps a Datapoint or Four-Phase also after new business. At any rate, more and more first-time users are certain to learn the meaning of "System Three."

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation -- but they are definitely estimates. Computer manufacturers, as a rule, do not directly supply this type of information. It is only through the use of IDC's extensive data files and other information sources that estimates such as those in this Census are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. These machines are byte or character oriented -- with the exception of large-scale scientific computers that have large words -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

Also, the Group A Census now includes the classification of computer models by size class -- based on the IBM product line (rather than constantly shifting average system values) and what other manufacturers' products compete with which IBM computers. There are seven size classes in all based as follows: Class 1 -- S/32; Class 2 -- S/3 (Mod 6 to 12); Class 3 -- 370/115; Class 4 -- 370/125&135; Class 5 -- 370/145; Class 6 -- 370/158; Class 7 -- 370/168. In a way, these classifications are arbitrary . . . so comments and suggestions from readers are more than appreciated.

AS OF OCTOBER 1, 1975

NAME OF MANUFACTURER	COMPUTER MODEL	CLASS	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Burroughs	B-200	3	$ 5,600	11/61	64	51	115	X
	B-300	3	$ 5,200	7/65	270	55	325	X
	B-500	3	$ 6,000	11/68	408	410	818	X
	B-70X/71X	2	$ 1,300	3/73	315	185	500	140
	B-72X	2	$ 2,000	4/75	30	10	40	50
	B-1712	2	$ 2,100	8/72	285	166	451	100
	B-1714	2	$ 2,250	8/72	402	235	637	130
	B-1718	3	$ 3,500	11/74	25	15	40	55
	B-1726	3	$ 5,900	2/73	221	86	307	60
	B-1728	3	$ 8,300	8/73	119	56	175	50
	B-2500	4	$ 8,900	2/67	125	100	225	X
	B-2700	4	$ 8,700	8/72	205	115	320	45
	B-3500	4	$ 16,000	5/67	530	302	832	X
	B-3700	4	$ 22,600	11/72	142	68	210	20
	B-45/4700	5	$ 27,300	10/71	203	143	346	20
	B-4790	5	$ 41,000	11/75	5	2	7	40
	B-5500	3	$ 35,000	3/63	60	26	86	X
	B-5700	5	$ 29,500	12/70	22	7	29	X
	B-65/6700	6	$ 57,500	11/69	92	76	168	7
	B-7700	7	$120,000	8/73	7	2	9	3
	B-7750	7	$135,000	/75	1	-	1	1
	Subtotal				3,531	2,110	5,641	721
CDC	G-20	4	$ 19,600	4/61	3	5	8	X
	1604/A/B	6	$ 42,000	1/60	13	4	17	X
	31/3150	4	$ 9,100	12/74	82	47	129	X
	3170	5	$ 19,200	12/70	12	15	27	X
	3200	4	$ 14,700	5/64	46	44	90	X
	3300	5	$ 29,900	9/65	108	83	191	X
	3400	5	$ 23,700	11/64	4	8	12	X
	3500	5	$ 26,000	1/69	10	17	27	X
	3600	6	$ 49,000	6/63	13	9	22	X
	3800	6	$ 53,000	12/65	19	3	22	X
	6200	6	$ 39,000	11/70	2	6	8	X
	Cyber-72	5	$ 36,300	10/71	30	51	81	5
	Cyber-172	6	$ 41,200	7/75	-	1	1	12
	6400	6	$ 54,000	5/66	60	50	110	X
	Cyber-73	6	$ 51,700	3/72	24	40	64	5
	Cyber-173	6	$ 54,600	9/75	-	1	1	12
	6500	6	$ 74,800	12/67	20	15	35	X
	6600	7	$119,600	8/64	57	29	86	X
	Cyber-74	7	$115,500	3/72	7	7	14	2
	Cyber-174	6	$ 67,500	9/75	-	-	-	3
	Cyber-175	7	$ 84,000	8/75	-	-	-	1
	6700	7	$125,000	7/70	3	-	3	X
	7600	7	$171,600	1/69	15	6	21	X
	Cyber-76	7	$165,000	3/72	2	4	6	2
	Star-100	7	$250,000	12/73	1	-	1	2
	Subtotal				531	445	976	44
Digital Equipment Corporation	PDP-6	4	$ 10,000	10/64	14	8	22	X
	1040/1050	4	$ 13,300	10/67	190	76	266	7
	1055	4	$ 22,000	12/71	31	13	44	4
	1070/1077	5	$ 30,000	6/72	50	10	60	5
	1080	6	$ 30,000	6/75	2	-	2	3
	Subtotal				287	107	394	19
HIS	Gamma 10	2	$ 2,500	7/64	-	900	900	X
	Gamma 30	4	$ 10,100	2/62	-	110	110	X
	G-5X Series	2	$ 1,650	1/66	640	3,030	3,670	X
	G-100 Series	3	$ 4,100	4/66	217	1,435	1,652	X
	G-200 Series	4	$ 14,000	4/61	155	45	200	X
	G-400 Series	4	$ 16,650	5/64	250	331	581	X
	G-615/25/35	6	$ 73,300	4/65	46	45	91	X
	G-645	7	$112,400	7/66	2	1	3	X
	G-6025	5	$ 22,200	11/73	36	13	49	X
	G-6030/40	5	$ 37,000	6/71	85	110	195	X
	G-6050/60	6	$ 52,000	7/71	92	50	142	X
	G-6070/80	6	$ 68,900	7/71	38	14	52	X
	G-6180	7	$102,000	2/74	3	-	3	X
	G-Subtotal				1,564	6,084	7,648	
	H-105/115	3	$ 4,350	3/70	1,095	460	1,555	X
	H-110/120	3	$ 4,050	1/66	302	211	513	X
	H-125	4	$ 8,400	12/67	57	195	252	X
	H-200	3	$ 6,500	3/64	353	176	529	X
	H-2020	3	$ 2,400	2/73	470	80	550	X
	H-2030	3	$ 5,150	1/73	92	20	112	X
	H-2040	4	$ 9,900	4/72	323	110	433	X
	H-1015	4	$ 12,750	4/71	105	58	163	X
	H-2050	4	$ 14,800	4/72	190	70	260	X
	H-12/1250	4	$ 12,700	2/66	260	140	400	X
	H-2105	4	$ 18,300	2/71	95	55	150	X
	H-2060	4	$ 21,000	4/72	95	20	115	X
	H-2200	4	$ 20,000	1/66	105	44	149	X
	H-2070	5	$ 25,300	5/72	63	11	74	X
	H-3200	5	$ 27,400	2/70	72	28	100	X
	H-4200	5	$ 31,600	9/68	22	4	26	X
	H-2088	6	$ 44,900	/72	5	1	6	X
	H-8200	6	$ 74,500	2/69	22	4	26	X
	H-4/1400	4	$ 13,500	12/61	17	21	38	X
	H-800	5	$ 29,100	12/60	31	10	41	X
	H-1800	6	$ 4 ,900	7/64	7	4	11	X
	H-Subtotal				3,781	1,722	5,503	
	Series 60							
	61/58	2	$ 1,950	1/75	75	290	365	] 300
	61/60	2	$ 3,300	1/75	50	155	205	]
	62/40	2	$ 3,800	1/75	10	31	41	] 350
	62/60	3	$ 4,300	1/75	32	52	84	]
	64/20	3	$ 7,400	1/75	25	35	60	] 230
	64/40	4	$ 12,700	1/75	-	18	18	]
	66/10	4	$ 18,300	1/75	5	-	5	]
	66/20	5	$ 23,300	1/75	38	20	58	]
	66/40	5	$ 36,200	1/75	42	32	74	] 175
	66/60	6	$ 48,800	1/75	45	33	78	]
	66/80	7	$ 90,000	1/75	6	-	6	]
	68/60	6	$ 70,000	3/75	-	-	-	] 5
	68/80	7	$100,000	1/75	-	-	-	]
	Subtotal Series 60				328	666	994	1,060
	HIS Total				5,673	8,472	14,145	1,060

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AS OF OCTOBER 1, 1975

NAME MANUFACTURER	COMPUTER MODEL	CLASS	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
IBM	System/32	1	$ 900	3/75	2,500	400	2,900	9,600
	System 3/6	2	$ 1,750	12/70	2,975	1,850	4,825	X
	System 3/8	2	$ 1,900	6/75	50	25	75	350
	System 3/10	2	$ 2,550	1/70	17,900	8,625	26,525	975
	System 3/15	3	$ 4,650	3/74	2,425	875	3,300	1,525
	370/115	3	$ 7,450	4/74	1,375	1,210	2,585	500
	370/125	4	$ 11,250	6/73	2,200	1,560	3,760	400
	370/135	4	$ 17,500	5/72	2,850	1,770	4,620	350
	370/145	5	$ 31,700	7/71	1,965	1,180	3,145	80
	370/155	6	$ 60,300	2/71	500	405	905	X
	370/158	6	$ 67,500	5/73	800	400	1,200	150
	370/165	7	$102,000	6/71	120	61	181	X
	370/168	7	$126,000	7/73	192	73	265	80
	370/195	7	$198,500	3/71	20	4	24	X
	360/20	3	$ 3,675	12/65	1,910	3,420	5,330	X
	360/22	3	$ 5,900	7/71	355	175	530	X
	360/25	3	$ 7,650	10/68	225	630	855	X
	360/30	4	$ 11,400	6/65	2,420	2,050	4,470	X
	360/44	4	$ 14,500	7/66	48	70	118	X
	360/40	4	$ 20,000	6/65	1,170	1,385	2,555	X
	360/50	5	$ 32,700	8/65	545	460	1,005	X
	360/65	6	$ 70,700	11/65	422	201	623	X
	360/67	7	$114,200	6/66	31	12	43	X
	360/75	7	$ 95,900	1/66	32	15	47	X
	360/85	7	$143,800	10/69	5	4	9	X
	360/95	7	$153,000	11/67	14	2	16	X
	Subtotal				43,049	26,862	69,911	14,010
	1130	2	$ 2,350	2/66	2,140	1,680	3,820	X
	1401	3	$ 3,775	9/60	710	675	1,385	X
	1401-G	2	$ 2,350	5/64	55	23	78	X
	1401-H	2	$ 1,325	6/67	18	33	51	X
	1410	4	$ 17,350	11/61	80	46	126	X
	1440	3	$ 4,800	4/63	140	145	285	X
	1460	4	$ 10,000	10/63	32	30	62	X
	1620	3	$ 2,750	9/60	223	180	403	X
	7010	5	$ 26,500	10/63	11	7	18	X
	7030	7	$163,200	5/61	3	1	4	X
	704	5	$ 32,600	12/55	1	1	2	X
	7040	5	$ 25,500	6/63	7	14	21	X
	7044	5	$ 37,200	6/63	8	10	18	X
	705	5	$ 38,800	1/56	2	3	5	X
	7070-74	5	$ 27,500	3/60	92	32	124	X
	7080	6	$ 61,200	8/61	40	1	41	X
	7090-94	6	$ 71,900	8/60	54	9	63	X
	Subtotal				3,616	2,890	6,506	X
	Total IBM				46,665	29,752	76,417	14,010
NCR	Century-50	2	$ 2,050	2/71	950	235	1,185	X
	Century-100	3	$ 2,980	9/68	605	875	1,480	X
	Century-101	3	$ 2,850	10/72	1,300	265	1,565	400
	Century-151	3	$ 3,500	2/75	78	20	98	75
	Century-200	4	$ 8,000	9/69	585	350	935	X
	Century-201	4	$ 10,000	8/74	110	28	138	70
	Century-251	4	$ 10,000	11/73	160	66	226	60
	Century-300	5	$ 22,600	2/72	51	30	81	3
	304	4	$ 10,000	1/60	4	–	4	X
	310	2	$ 1,000	5/61	13	10	23	X
	315	3	$ 5,000	5/62	273	330	603	X
	315-RMC	4	$ 11,800	9/65	41	33	74	X
	390	2	$ 800	5/61	185	115	300	X
	500	2	$ 1,150	10/65	610	1,285	1,895	X
	Subtotal				4,965	3,642	8,607	608
Philco	1000	3	$ 7,000	6/63	8	1	9	X
	210/211	5	$ 40,000	10/58	5	1	6	X
	212	5	$ 52,000	1/63	4	1	5	X
	Subtotal				17	3	20	X
Singer	System 10	2	$ 2,550	10/70	1,270	900	2,170	100
Standard Computer	IC-4000	3	$ 9,000	9/68	4	–	4	X
	IC-6000	4	$ 16,000	5/67	3	–	3	X
	IC-7000	4	$ 17,000	6/69	7	–	7	X
	Subtotal				14	–	14	X
Univac	I/II	5	$ 26,500	3/51	3	2	5	X
	III	5	$ 26,900	8/62	30	35	65	X
	SS-80/90	4	$ 8,500	8/58	10	16	26	X
	418-I/II	4	$ 14,500	6/63	68	60	128	X
	418-III	5	$ 20,800	7/69	44	55	99	X
	491/492	5	$ 28,600	12/61	15	12	27	X
	494	6	$ 44,300	2/66	49	44	93	X
	1004	2	$ 1,100	2/63	740	665	1,405	X
	1005	2	$ 1,730	4/66	570	170	740	X
	1050	4	$ 9,325	9/63	140	130	270	X
	1103/05	6	$ 37,100	12/50	–	3	3	X
	1106	6	$ 42,400	12/69	100	150	250	15
	1107	6	$ 60,400	10/62	5	13	18	X
	1108	7	$ 72,800	9/65	125	95	220	X
	1110	7	$ 90,100	6/72	40	51	91	8
	9200	2	$ 2,530	6/67	1,055	825	1,880	X
	9300	3	$ 4,300	9/67	805	825	1,630	X
	9400	4	$ 12,300	5/69	215	250	465	X
	9700	5	$ 22,900	8/72	10	17	27	X
	90/30	5	$ 8,700	2/75	110	65	175	625
	90/60	5	$ 17,200	1/74	160	62	222	115
	90/70	5	$ 23,300	11/73	70	35	105	50
	1100/20	6	$ 43,300	4/75	10	3	13	35
	1100/40	7	$113,300	7/75	2	–	2	30
	Subtotal				4,376	3,583	7,959	878
	301	4	$ 7,060	10/60	107	6	113	X
	501	5	$ 17,100	6/59	8	–	8	X
	3301	5	$ 24,100	7/64	53	–	53	X
	Spectra 70/15	3	$ 4,200	9/65	11	–	11	X
	Spectra 70/25	3	$ 7,400	9/65	2	2	4	X
	Spectra 70/35	4	$ 13,000	1/67	85	5	90	X
	Spectra 70/45	5	$ 24,000	11/65	235	18	253	X
	Spectra 70/46	5	$ 40,400	11/68	30	2	32	X
	Spectra 70/55	5	$ 38,400	11/68	7	2	9	X
	Spectra 70/60	6	$ 44,500	9/70	19	–	19	X
	Spectra 70/61	6	$ 50,000	3/71	10	–	10	X
	Spectra 1600	3	$ 3,800	1/69	65	–	65	X
	Spectra 70/2	4	$ 12,600	7/71	104	–	104	X
	Spectra 70/3	4	$ 20,400	10/71	19	–	19	X
	Spectra 70/6	5	$ 32,200	10/71	44	–	44	X
	Spectra 70/7	6	$ 39,900	10/71	21	–	21	X
	Subtotal				820	35	855	X
	Total Univac				5,196	3,618	8,814	878
Xerox	Sigma-5	4	$ 12,650	8/67	247	56	303	X
	Sigma-6	4	$ 20,000	11/70	38	8	46	X
	Sigma-7	5	$ 24,700	12/66	82	20	102	X
	Sigma-8	4	$ 19,000	9/71	25	9	34	X
	Sigma-9	6	$ 44,000	11/71	45	8	53	X
	530	3	$ 3,500	8/73	260	58	318	50
	550	3	$ 7,525	11/74	55	15	70	30
	560	4	$ 17,030	11/74	16	3	19	5
	940	5	$ 24,000	4/66	50	4	54	X
	9300	3	$ 8,500	11/64	16	4	20	X
	Subtotal				834	185	1,019	85
TOTAL					68,983	49,234	118,217	17,525

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• LIFTING THE PRETRIAL "GAG" RULE, Judge David N. Edelstein acceded to the wishes of both sides in IBM's antitrust trial. IBM and the DOJ are now free to discuss the case. But remember, reminds Edelstein, lawyers disseminating information about the case are still expected to live up to their code of ethics.

• ALSO ON THE IBM LEGAL SCENE RECENTLY was a California court judge's dismissal of Symbolic Control, Inc.'s antitrust case against IBM. The suit was filed in 1971, two years after Symbolic Control organized to market software products in the numerical control area. The company's product line quickly boiled down to only one product, an NC system similar to one already being marketed by IBM. The fact that the company couldn't sell a single one of its products, wasn't shown by the evidence said the judge. "Plaintiff's general assertions about how users might have responded to APT/70 in hypothetical, nonexistent circumstances are entirely speculative and do not remotely meet the plaintiff's burden of proof." The defunct company will ask for a new trial, may appeal if it's refused.

• TAKING A STAB AT THE TIMESHARING SERVICES INDUSTRY? . . . IBM recently announced "Virtual Storage Personal Computing" for use with IBM 370/135s and up. The software product makes it possible for unprofessional users to take advantage of the computing power of their company computers. While the DP departments concentrate on big jobs, individual "problem solvers" can be working away at IBM terminals attached remotely. The system seems to be both a way to provide distibuted computing to large organizations -- and a way for IBM to garner revenue from new sources. EDP/IR thinks the implications are important -- especially to the timesharing industry -- and will examine it more closely in a later issue.

• "ALTHOUGH THE PRICES LOOK LIKE A MISPRINT" says the company's sales brochure, Houston Instruments (Division of Bausch & Lomb) has announced a 2400 line-per-minute printer that costs $3000. Using nonimpact technology and a digital motor to drive the paper, the Model 8210, as it is called, advances either fan-fold or roll electrostatic paper at 400 inches per minute. (The printer can core dump a 64 KB mini in 30 seconds, says the company.) The $3000 system, though, prints only 80 columns wide on 8 and 1/2 inch paper. Houston's marketing people feel their best market will be minicomputer end users.

• HUP TWO THREE CORE, HUP TWO THREE CORE! . . . the Navy has awarded CDC a contract for 70 militarized units of its extended core memory units (ECMU) at a cost to Uncle Sam of $19.7 million. Five years in development, the ECMU is designed around the large plane memory module CDC produced for its MP-60. The core memory is confined in 32K 36-bit increments with a maximum capacity of 256K words.

• ACQUISITIONS AND LOOSE ENDS: first, Honeywell and Xerox have signed their support agreement, following the letter of intent signed last fall (EDP/IR, Oct. 24, 1975). In another move, Xerox has aquired Versatec, Inc., a California company that manufactures electrostatic printers and plotters. And last, but not least, Sperry Univac's ISS operation has signed an agreement with Electronic Memories and Magnetics to purchase certain of the media manufacturing assets of its Caelus Memories, Inc., California-based subsidiary.

• COMPUTER SCIENCE CORPORATION HAS STRENGTHENED INFONET with the installation of new switching concentrators and bi-plexers. Data transmission speed is doubled and more reliable, users are no longer linked to specific computers in the net, and the U.S. network is now linked to INFONET networks in other countries.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JANUARY 30, 1976 • VOL.11,NO.12 P.J.McGOVERN,PUBLISHER

New HIS emphasis

HONEYWELL MAKES ITS MOVE AT LAST . . . CALLS IT LEVEL 6
THREE MINIS PRESAGE A FULL LINE; OEMS AND DISTRIBUTED COMPUTING TARGETED

It is time for a shift in marketing emphasis -- a shift away from trivial add-ons, subtle refinements, and invisible extras. We need new technologies and genuinely new products to fill the needs our customers are aware of, as well as the needs they do not yet know they have.

Most marketing failures are due to imitative, catch-up products or products that did not have a real need in the marketplace . . . .
-- from Wall Street Journal's "Notables and Quotables" on 1/19/76; E.W. Spencer, Honeywell CEO

Eyeing the clip at which the minicomputer industry is growing compared to the relatively stodgy general-purpose mainframe market, Honeywell announced last week a new mini contingent to its Series 60 computers. The announcement was long expected, several times delayed. But finally -- the day after Spencer was quoted in the Journal -- the wraps came off.

And whether it is or it isn't a catch-up product -- as some might argue, in view of the company's flat mini sales for the past two years and previously aged product line -- Level 6 is definitely not trivial. As a minicomputer line with up-to-date technology, respectable performance, and follow-on products promised, it will certainly have to be reckoned with by DEC, Data General, Hewlett-Packard, and the other companies out there in miniland.

As a major thrust into a new and different business -- one with its own marketplace peculiarities and corporate way of thinking -- coming from the company which may be IBM's closest rival, it's even more significant.

Commitment is the key. As one competitor groused, "it takes more than three products to make it in this business." Honeywell says it is committed . . . more models and new software will be announced this year, a dedicated sales force has been set up for an OEM push, plenty of money was spent in development. No less than Stephen Keating, the Chairman of the Board, kicked off the press conference.

But Honeywell has other commitments, too. "We further believe our substantial commitment to the growing minicomputer market will strengthen our position in

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the entire industry," said Keating at the press gathering. But if it doesn't complement Honeywell's large systems business -- or if those commitments clash when development monies are parceled out -- what then?

Gulliver in miniland

While Honeywell rivals guardedly pricked Level 6 balloons ("might've been state-of-the-art two or three years ago, but not now"), they still had to admit that the minis were as competent as any other single systems out there. But machinery isn't everything. "Sure it'll be a fine product," said one, "and you can bet they'll do one helluva job of marketing it." In fact, what little sour grapes EDP/IR could detect in competitors' responses seemed to stem more than anything else from the automatic attention any Honeywell product was bound to generate.

(And that attention, says Honeywell after ten days, has been "astonishing" . . . especially from the company's large system customers. A single ad in the Wall Street Journal drew over 500 responses last week.)

Honeywell's real threat, then, is muscle. With a good product and serious effort, the company should easily be able to regain its lost market share in minis -- from 10% of shipments in 1973 to 4% in 1975, according to IDC figures -- to vie with Data General and Hewlett-Packard behind leader DEC. And in the OEM market, where Honeywell hasn't been a major influence, even more drastic changes could occur (for a picture of that market see EDP/IR, Nov. 24, 1975).

Bussin' . . .

The seed models of the Level 6 product line are the Models 6/06, 6/34, and 6/36 medium-scale minis. The 6/06 is a smaller, technologically updated version of the System 700 and is designed for end-user use; the 6/30s are slated for OEM markets. Semiconductor memory runs from 8K and 64K words; prices start at $2,600 (OEM quantities) and might run as high as $50,000 counting peripherals.

Drawing card for the 6/30 models (the real Level 6 machines?) will be its architecture, says the company. The distinctive features include:

+ A 6MB/second "Megabus" as data conduit. Cycle time is 300ns, address word length is 24 bits.

+ Memory, CPU, and various controllers connect to the Megabus. Each major component is packaged on its own board.

+ Firmware-driven, modular microprocessors which drive, in turn, each of the major components.

+ Maintainability. A "shoestring" diagnostic signal can be sent through the connected components. If it doesn't make it, the trouble can be isolated to a single, easily removed board.

Another feature of the Level 6 is its software -- or lack of it. Two operating systems are offered -- which take up 8K of memory and require a console and dual diskettes -- but Fortran IV is the only higher-level language supported. And that takes another 8K of memory. But Honeywell promises more . . . hoping that OEM business will overcome manufacturing inertia while the software writers work up something more suited to the end user.

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OTHER BIG-GUY MINIS

In a way, Honeywell isn't the only mainframer in the mini business. NCR is in there swinging also. But by the nature of traditional definitions of "minicomputer" -- NCR OEMs only to itself, the system is used as a solution more than a tool, etc. (EDP/IR,Nov.24,1975) -- the system isn't usually thought of within the context of the minicomputer industry.

NCR's mini is really a series of processors called the "600 Series" internally and powering such NCR offerings as the NCR 399 accounting machine, the NCR 725 and 726 in-store POS controllers, and the NCR Century 8200, which anchors the "Spirit" on-line order-entry system and the "IHIS" interactive computer system for hospitals (EDP/IR, Feb.12 and Sept.15,1975).

It's a thriving family. An NCR 499 -- successor to the 399 -- was introduced last week, comes with 8K to 32K bytes of memory, a 75 cps bidirectional matrix printer and other peripherals; the Century 8200 got a COBOL compiler and an interactive multiprogramming operating system this week, an Interactive Wholesale Distribution System (IWDS) the week before.

Hidden thusly from view in NCR products, though -- the 600 Series processors are not available on their own -- NCR's minis avoid IDC's usual census taking. But NCR estimates that it has about 18,000 mini systems installed worldwide, most of which are "600s." (Those that aren't reside in entry-level 299s.) Separately, NCR has estimated its 399 installations at 10,000 worldwide. Now that's a lot of processors . . . whether you call them minis or not.

. . . and integration

Honeywell's rebirth in minis is predicated on the belief that knowledge, expertise, and customers can be passed across the minicomputer and general-purpose system boundry. Circuit board manufacturing for its large systems, for instance, has provided efficiences in producing and designing components used in Level 6, says the company. And someday, adds a marketing man, software clippings from the larger systems' material may be molded into minicomputer applications packages. Furthermore, Honeywell points out that users of its bigger systems looking for minis to implement distributed processing now have one-stop shopping.

It may not be easy . . . mini guys speak a different language. But the industry may well be ripe for the explorations of a Gulliver. Minicomputer revenues last year topped $1.25 billion and should reach $3 billion before 1980 -- enough of a market to catch the eye of a big company's top management. (Texas Instruments also comes to mind in this regard.) And a big company with the proper resources -- and willing to use them -- could make significant waves.

Honeywell's task now is integration. It must mesh its minicomputer efforts with corporate goals, integrate Level 6 into Series 60 without affecting large system revenues, and learn to "think mini" up the corporate echelon . . . which already may think "controls" more than "computers."

Does Honeywell fear the "generalist" trap in the mainframe industry (as GE might say in Edelstein's courtroom)? To remain so requires immense amounts of money and concentration. "No," says Keating, dismissing any decommitment. "Commitment to these minicomputers in no way means a let-up in our general systems business. Not at all." But if the integration doesn't go so smoothly . . .?

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TSO for the masses?

IS IBM'S NEW TIMESHARING PRODUCT REALLY A COMPETITIVE WEDGE AS REMOTE/RAW POWER SERVICES GROW, SHOW PROFIT, AND CHANGE?

"V-S-P-C?"

This latest set of initials, says IBM, is for the little fish in the big pond . . . the DP unsophisticate whose jobs are too small, needs too trivial to tie up system and staff resources in a big 370 VS shop. With "VSPC" -- Virtual Storage Personal Computing -- problem-solvers in the corporate woodwork can now interact with their company's computer . . . all without bugging the DP staff.

Instead of timesharing with a service bureau, massaging batch-processed reports, or plain doing without, "engineers, financial analysts, statisticians and other professionals who may have little or no data processing experience can use the problem-solving power of a computer . . . ." With programmers freed to work on new applications and CPU power distributed directly to company employees, says IBM, businesses will save money through more efficient use of data processing.

And they'll have to. VSPC's price is high . . . 100KB of memory to support it and a monthly license fee from $900 to $1200. Required operating system software -- like VTAM and VSAM -- and the programming languages needed to make VSPC truly usable to the nonDPer quickly run up costs and memory requirements. (The minimum memory required under DOS/VS to run concurrent batch and support three VSPC terminals is 256KB; for OS/VS1 it's 384KB; and for OS/VS2 it's 2,000KB.)

So what do we have here, anyway, asks EDP/IR?

+ Is this a version of TSO for the masses? Does it complement TSO and CMS as IBM says . . . or does it fill in potholes caused by their complexity, limited acceptance, and tax on the system?

+ Is this a boon to users that springs organically out of the advantages of VS . . . or a bid to make artificial advantages more attractive?

+ Are those the same "engineers, financial analysts, statisticians" and other problem solvers that are part of the IBM 5100 market? Will DPD be bumping into GSD in the marketplace?

+ Whose customer will VSPC take away?

While EDP/IR suspects the answers to these questions may fall into the "all of the above" category -- advantages to the users will not come without a price -- at least some clear advantages to IBM are seen. The product adds a reason to buy IBM terminals . . . it's another link in the SNA, VS chain . . . and it gives users one more alternative heretofore unavailable in the IBM stable. Thus a customer base is groomed for the future . . . and revenues got from new directions.

To EDP/IR, it looks as if VSPC's major impact (besides on the DP manager looking to justify IBMness or a switch to VS) will be on the remote, raw power service firms -- *if not head-to-head in today's marketplace, at least in lost potential.*

If so, it's the Giant's second salvo against the timesharing boys in a trimester . . . c.f. the IBM 5100. IBM, remember, is out of services until 1979.

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THE COMPONENTS OF VSPC

What hath IBM wrought? An interactive program product, it says, with a simplified command set that makes it particularly easy for the first-time user to operate. Access to the computer (370/135 and up or 370/115 and 125 with 262KB of memory) can be through many IBM terminals, including the 3767, 2741, 3770, and 3270. The latter -- and some printers -- have been enhanced to handle all the necessary characters inherent in use of APL.

VSPC runs under OS/VS1 (at a monthly fee of $1100), OS/VS2 ($1200/month), and DOS/VS ($900/month) operating systems. The DP manager can allocate CPU time and data storage space available to VSPC users and assign ID codes and passwords for security . . . thereby maintaining control over the system.

Programs for VSPC users can be written by either the in-house DP staff or the users themselves under one of three IBM program languages offered:

- VS APL ($400 a month)
- VSPC Fortran ($400 a month)
- VS BASIC ($385 a month) -- also available for use with TSO

VSPC, under a conversational remote job entry facility, can also run long jobs -- such as analyzing data in large files -- where no user interaction is required. Additionally, DP programmers can utilize VSPC for program development and testing using any language supported by the VS control program.

The TS reaction

When EDP/IR queried all the major timesharing bureaus, the predominate response to VSPC was "too soon. Can't evaluate." But, significantly, they were all aware of its existence (not so among the users sampled), and some had done fairly extensive preliminary analysis. "We won't know until we run it through its dance," said one, "and we'll certainly do that."

Some thought that VSPC would have little direct effect on their business, for one reason or another, and in a way, they may be right . . . for VSPC may less impinge on their current business . . . than act to hasten changes already underway in the industry:

- Vendors are diversifying their services -- adding software tools to their raw power, often using data base management systems and designing proprietary data bases to go with their DBMS capability. While "plain vanilla" raw computer power will remain a healthy market in this decade, other subindustries -- autotransaction services, facilities management, maintenance, etc. -- will grow faster.

- Timesharing networks are extended and upgraded . . . as they become a prime resource of many service firms. Meanwhile, reliability is becoming of major interest . . . as suppliers place greater emphasis on applications that are the heart of business operations.

- A new surge of acquisitions appears to be starting. While the major suppliers show healthy growth rates and increasing profit margins these days, the smaller ones have had tougher going as a result of a lack of resources and/or marketing strength.

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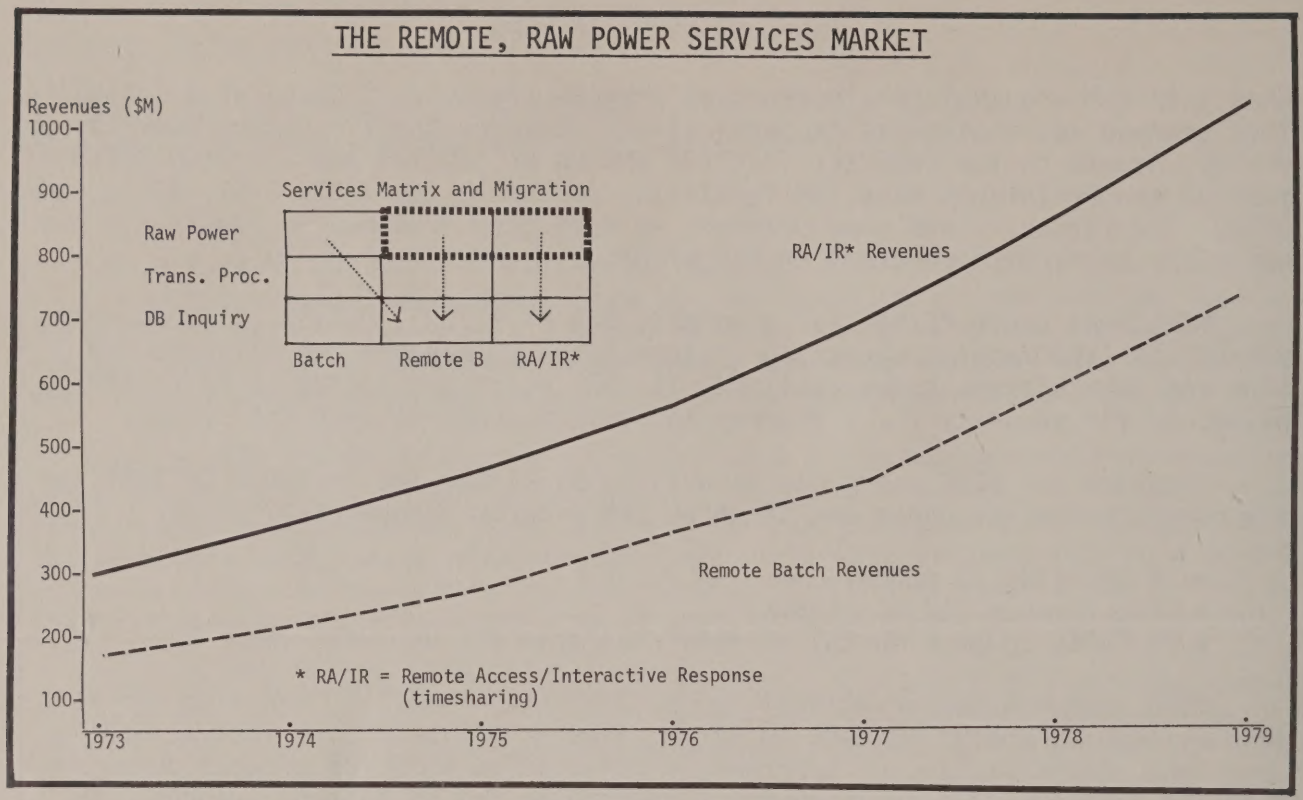

- As distributed computing for in-house DP catches on, the remote, raw power suppliers will find competition from small business computers, intelligent terminals, and minicomputers intensifying . . . their own role largely one of educating a market for later, in-house system use -- except where very large, shared, or proprietary data bases are involved. The trick is to stay a step ahead with software development.

An upshot of these trends -- boosted, perhaps, by VSPC -- will be a change in the makeup of the industry. Smaller companies will likely find themselves gobbled up by bigger ones . . . with the all-encompassing computer utilities envisioned in the 1960s emerging as a result.

Going in-house

Though VSPC represents a new way for a firm to bring its timesharing in-house . . . the remote, raw power services have been facing that threat all along. VSPC is just one more factor management will now have to consider in making the move.

Besides, an in-house system is not necessarily a one-for-one replacement of outside services. For example, at the First National City Bank of New York (Citibank) when an Interactive Computer Center (ICC) was set up several years ago to handle the company's timesharing load, some intersting consequences ensued:

- The in-house service (ICC) rapidly penetrated to 90% of the company's timesharing usage, measured in user jobs.

- Overall interactive computing -- thanks to lower overhead and nonexistent marketing costs -- increased exponentially.

- So outside timesharing revenue still increased — perhaps faster than it would have without ICC's runoff -- peaking during system startup.

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While Citibank's well-chronicled and successful experience going in-house pointed up the advantages and cost savings of doing so, it also took a final form different from the one envisioned . . . but by the time its original justification had disappeared, new ones had arisen to take its place. Other companies -- perhaps more heavily committed to outside services than Citibank was at the time -- may be more reluctant to take the plunge.

The marketplace

With these trends in mind, International Data Corporation, publisher of the Gray Sheet, forecasts that the remote, raw power services industry will grow about 25% a year to almost $1.8 billion by yearend 1979 . . . with a preliminary estimate of 1975's yearend total at $715 million. Slightly more of this growth will come from remote-batch than from timesharing services, as shown on page 6.

Note that remote, raw power services constitute only a portion of the total computer services industry. According to IDC's preliminary estimates:

- Remote, raw power services accounted for about a quarter of all computer services 1975 revenue of $3.17 billion.

- Another 25% came from remote autotransaction services -- the bottom right four blocks in the "Services Matrix" shown — and this sector will grow even faster, to almost 40% of the total by yearend 1980.

The current remote, raw power suppliers are a fragmented bunch . . . GE's Information Services Division, for example, led the bunch in 1974 with only 15% of the market. Runner-up was CDC's Service Bureau Corporation (not counting major autotransaction services for hospitals, banks, etc.) with 11% of the market.

Tymshare and Computer Sciences Corporation each had 6% . . . National CSS 5% (again, not counting autotransaction services). After that came UCC, McAuto, United Computing Systems, Cyphernetics, On-line Systems, Rapidata, and ComShare with revenues falling between $9 million and $30 million.

The IBM presence

The service companies with the best chances of survival, then, are the dynamic ones . . . the moving targets. And if, by their motion and direction, they don't notice a direct IBM pressure -- still they're subject to its indirect influence. A "no, we don't expect IBM's new product to impact our business much" begs the question a little . . . in light of the influence IBM can have on the way its users put their computers to work.

"It's sort of funny. Looks like IBM is catching up with the rest of the world," said one user to EDP/IR. His was a backwater division of a major corporation that was currently timesharing on a DEC mini ("our division has successfully avoided being enfolded in Corporate's IBM shop"). But he could as easily have been a timesharing service bureau customer.

VSPC, he thought, would help the corporate DP center now attain some of the advantages he was enjoying in the hinterlands with his PDP-11. Why couldn't they before? "Well, it's an IBM shop," he said. One wonders. Is VSPC a sign of IBM catching up to the rest of the world . . ? No matter, it clearly looks like one more of IBM's efforts to slice a larger piece of the user spending pie.

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• IT'S NO LONGER PURCHASE ONLY IN THE GIANT'S AUTOTRANSACTION STORE . . . not since IBM quietly introduced in late December a five-year lease plan for the 3606 and 3608 financial services terminals, the 3653 POS terminal, the 3663 supermarket terminals and checkout scanner. The 60-month plan -- the alternative term plan (ATP) -- is IBM's longest lease available. ATP also features unlimited one-year extensions and a clause that prices can't be raised more than 5% a year (similar to the clause in IBM's TAP for the System/32.)

Intriguing most analysts is the Giant's motivation. Does IBM intend to fill the gap left by Singer with a major push in autotransaction? Will leasing plans help the sale of autotransaction hardware, and will IBM push for industry leadership? How will the smaller companies (including NCR) face the increased capital demands if leasing/rental becomes a de facto autotransaction standard? We'll see . . . .

• IBM'S TWEAKING OF RENTAL/PURCHASE RATIOS HAS APPARENTLY PAID OFF as outright purchases of equipment picked up in the latter part of 1975 to bouy the companies revenues and earnings to a record high of $14.4 billion and $3.7 billion respectively. Interestingly, much of that 14% increase in revenues is from overseas operations . . . where gross income rose 23% from 1974 and surpassed domestic revenues for the first time in history. Net earnings per share amounted to $13.35 in 1975; the company authorized a $1.75 quarterly dividend this week.

• FIRST SERVICE BUREAU TO ACQUIRE AN AMDAHL 470 is Computer Usage Company in Sunnyvale, CA. "We can now offer the first commercial application of Amdahl Corporation's exciting new IBM-compatible computer to businesses, universities, government and engineers with greater cost efficiency and superior job turnaround service," says CUC. The company, originally in software services, bought its current Computer Utility Data Center from Singer Corporation last spring.

• CDC HAS PLACED ITS FIRST CYBER 175, this one to a heavy equipment manufacturer in Europe. The machine handles 7.5 million operations per second -- about twice the speed of CDC's CYBER 74 -- and comes with a 131K-word memory and ten peripheral processors. It will be used for in-house timesharing.

• IT'S THE MOST SOPHISTICATED AND COMPLETE EFTS SYSTEM YET UNDERTAKEN, says System Development Corporation . . . which just landed a contract with the Savings Association Central Corporation (SACC) to design it. The system, due for initial operation in a year, will include an estimated 200 automated teller machines and 4550 POS devices when the system is fully complete in 1979. Sponsor SACC is a service organization of 88 California savings and loan associations. The EFTS net will include everything from check authorization and autotransaction services to transaction routing, security controls, interinstitutional settlement, and terminal control for teller, cash dispenser, and POS terminals.

• ENTREX HAS A NEW SOURCE DATA ENTRY SYSTEM -- the System 180, aimed at distributed data entry networks. The system includes a processor with 48K bytes of memory, a communications controller, a 2.4 MB removable-pack disk, and up to four keystations. Various printers can also be supported. With the "DATA/COMM" software that comes with the System 180, says Entrex, a user will be able to communicate with virtually any terminal or mainframe supporting bisynch communications. The System 180 is capable of emulating many IBM terminals and is compatible with the firm's other key-to-disk products. A single station System 180 costs $575 a month on a three-year lease, with printer $726.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" FEBRUARY 13, 1976 • VOL.11,NO.13 P.J.McGOVERN,PUBLISHER

Dollar portrait

IBM AT MID-DECADE: REVENUES PUSH $14.5 BILLION, EARNINGS $2 BILLION PURCHASES ON UPSWING; FOREIGN OPERATIONS OUTGUN DOMESTIC

Because IBM's data processing business is primarily rental, we have pointed out to stockholders on several previous occasions that outright sales, unlike rentals, increase current income at the expense of future periods.
-- T.J. Watson, IBM Chairman, 1969 annual report

The year and the decade roll on . . . and so does IBM's massive, well-oiled fiscal engine. Like a dreadnaught of old it steams steadily onward, subject, it seems at times, more to its own inner workings than outside pressures.

Its profitablity, for instance, or the ratio of earnings to revenues, hasn't dipped below 12% in thirteen years -- averaging almost 14% since the advent of the System/370. By contrast, most American firms these days score about 5% profitability -- including the other mainframe manufacturers, which averaged over the last two years an aggregate profitability under 4%.

And besides the year's numerical qualities -- decade midpoint, century three-quarter mark, and so on -- 1975 was significant for the IBM financial machine:

+ For the first time in history, revenues from overseas operations topped those from domestic business, although overseas earnings had been pulling more than half of that load since 1970.

+ Gyrations in sales as a percentage of revenue, begun in the recession of 1974, appear to have been compensated for. It took abnormally high sales to revenue, however, to do it.

+ In fact, it looks like the last half of 1975 marks the end of the recession as far as IBM -- and perhaps the other mainframers -- are concerned. Earnings per net investment in plant, rental machines and other property rose in 1975 after a decline in 1974 . . . while earnings per revenue began a pick-up in the latter half of the year.

+ (And the non-IBM mainframers, in aggregate, ended 1975 with last quarter earnings per revenue at the highest point in two years. Yet the second lowest quarter had been the one before.)

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+ IBM ended the year by announcing its longest lease plan ever, a 60-month "alternative term plan" announced for several autotransaction terminals (EDP/IR, January 30, 1975) that were previously purchase-only.

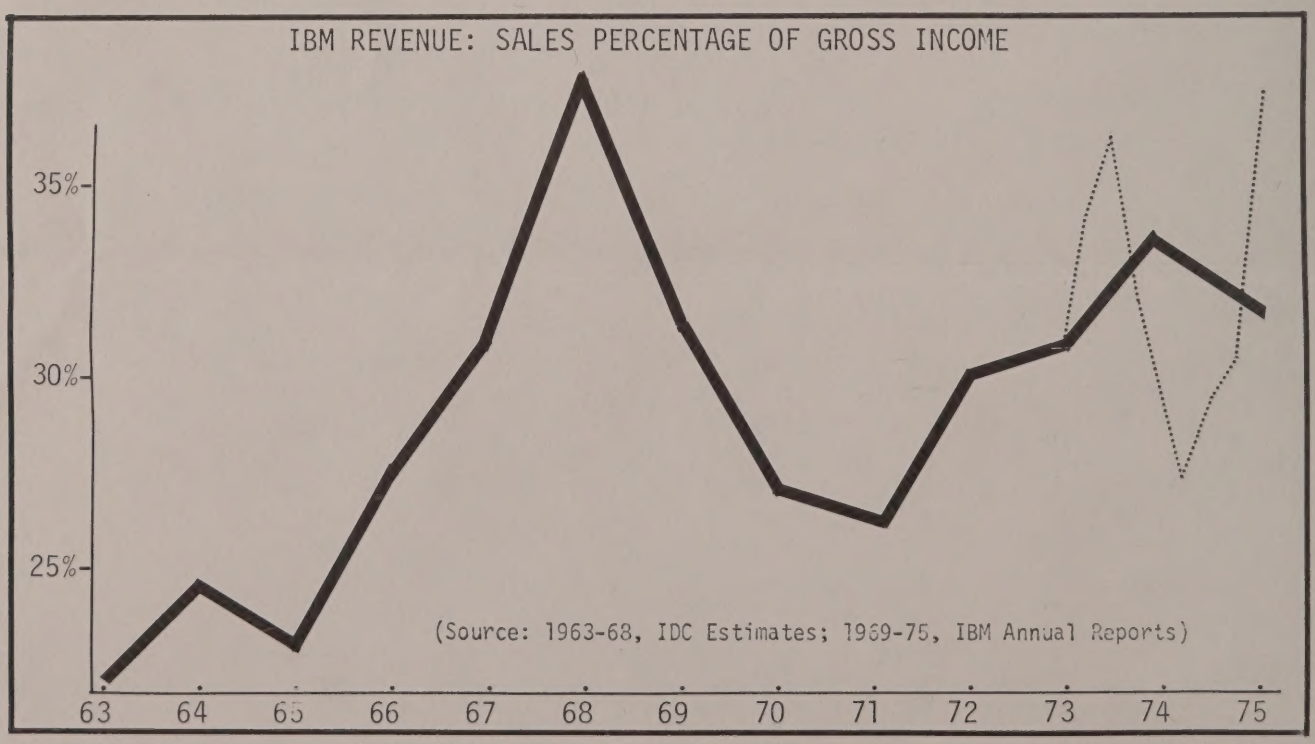
To maintain revenues on course during 1975, though, IBM had to tinker . . . as 1974 price hikes went into effect, some purchase prices got cut, selective rental hikes were announced, and new purchase-to-rent price ratios were offered on newly announced gear. As a result, outright sales increased progressively through the year, making up for a decline in shipments. And, as the new 60-month ATP illustrates, the Giant is still experimenting.

With that in mind, EDP/IR here takes a look at the financial cycles that have affected that IBM dreadnaught in times past, to see if there is a "future history" to be discerned -- or at least portended -- from its wake. After all, 1975 is important for another reason: it may have been the year before IBM's next family of computers was announced . . . .

The sales trail

As T.J. Watson saw it in 1969 -- and as F.T. Cary reiterated five years later in another annual report -- IBM views outright sales of data processing equipment as a mortgage on future earnings. What prompted Watson's caveat was 1968's giant spike in sales percentage caused by third-party lessors buying up 360s. Another spike, not so high, occurred in mid-1974 . . . just before the economy began its tailspin. Hence the latter warning.

And, in fact, after the 1968 spike, IBM's "Return on Investment" dropped considerably over the next three years. To a lesser extent, the same thing happened after a small spike in sales/revenue in 1964 . . . and in 1975, the "Return on Investment" dropped one percent below 1974's five-year high. IBM's ratio of sales to revenue for the last thirteen years is shown below: its "Return on Investment" is plotted on page 4.



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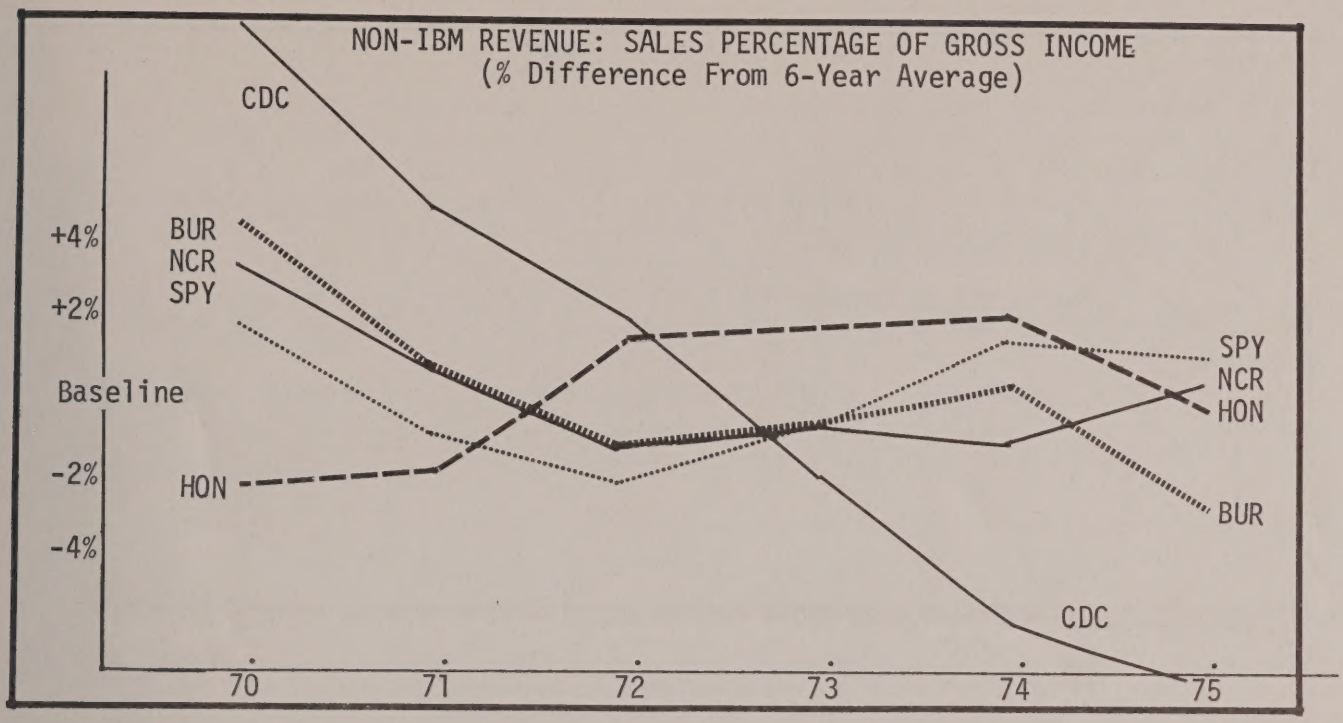

For comparison's sake, the sales/revenue ratio for the five other major mainframers is shown above. Here the ratio is shown as the difference between a baseline average (an unweighted six-year average of sales to revenue) and the yearly sales percentage of revenues. Since equipment "sales" means different things to different vendors, comparison and analysis of absolute values would be hazardous. Rather, it's the shape of the curve that we examine.

Note that NCR was the only mainframer not to see a drop in sales as a percent of revenue in 1975 and that CDC's sales are becoming decreasingly important as its services business grows (Commercial Credit is not included here).

The earnings curve

One advantage to increasing outright sales -- taking out that mortgage on future periods -- however, is the opportunity to give revenues and earnings a shot when needed (there are other implications, too, especially concerning the customer base, product cycles, etc.). The waves in the IBM "Earnings Curves" on page four seem to reflect that effect.

The other mainframers show significantly less earnings/revenue prowess than IBM, and, over a six-year period ending on December 31, 1975:

- Burroughs and DEC showed comparable general upward trends -- from 7% to 10% profitability.
- Sperry Rand cycled about the 4% mark, with 1975 tops at 4.5%.
- Honeywell hovered about 3% profitable, peaking in 1973.
- NCR, after losses in 1972, pulled back to within 1% of the composite 1975 average of 4.5% profitability.
- In the last six years CDC had only two profitable ones, 1972 and 1975.

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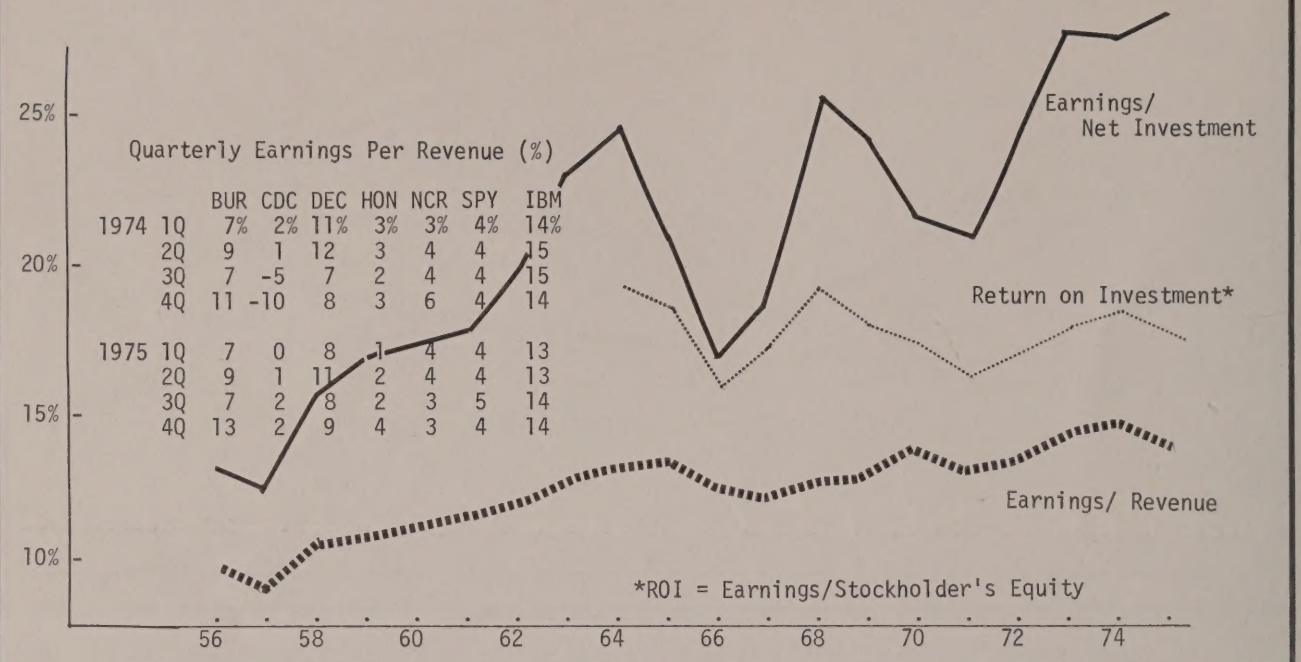
IBM'S "EARNINGS" CURVES



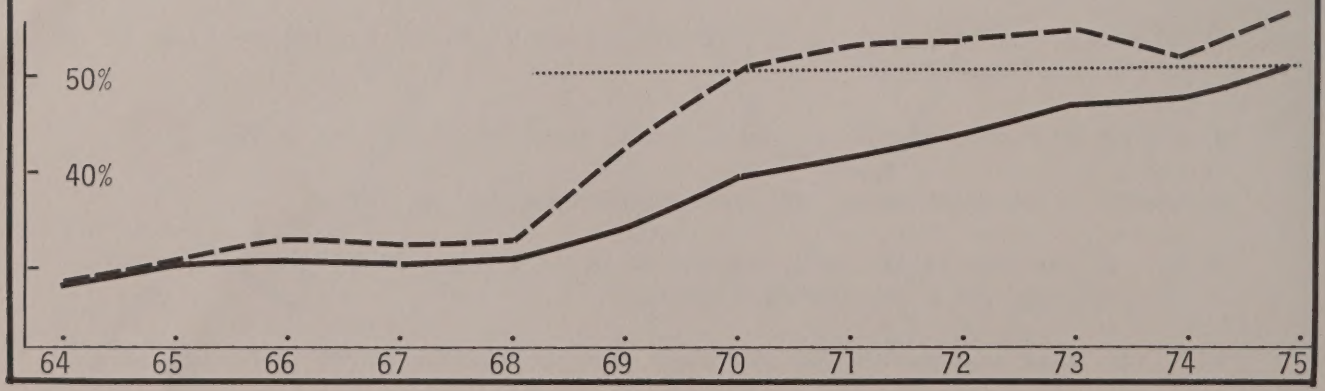
Quarterly Earnings Per Revenue (%)

		BUR	CDC	DEC	HON	NCR	SPY	IBM
1974	1Q	7%	2%	11%	3%	3%	4%	14%
	2Q	9	1	12	3	4	4	15
	3Q	7	-5	7	2	4	4	15
	4Q	11	-10	8	3	6	4	14
1975	1Q	7	0	8	1	4	4	13
	2Q	9	1	11	2	4	4	13
	3Q	7	2	8	2	3	5	14
	4Q	13	2	9	4	3	4	14

Also shown are the quarter-by-quarter earnings/revenue curves for 1974 and 1975. However, while the effect of the recession seems clear -- disastrous 1975 first quarters; ebullient fourth quarters -- the curves are somewhat distorted. For one thing, except for IBM, the mainframers generally show "down" first and third quarters, "up" second and fourth quarters anyway. For another, recent accounting changes mandated by the Financial Accounting Standards Board left many companies restating prior earnings, generally raising 4Q 1975 earnings -- at the expense of 4Q 1974. Though the accounting standards aren't mandatory until this year, NCR, Honeywell, Sperry and Burroughs all put them into effect early.

Another sign of the recession's impact appears in IBM's overseas returns. While revenue from foreign operations has steadily increased as a percentage of total revenue, foreign net earnings -- which had been contributing substantially more than a fair share of overall earnings -- showed a "glitch" in 1974. In other words, this time the recession hit overseas computer markets worse than domestic ones, unlike 1970's economic downturn.

IBM FOREIGN OPERATIONS: EARNINGS AND REVENUE SHARE



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The investment cycle

Powering the IBM juggernaut, of course, is its continual investment in plants, rental machines and other property. But as the company gets bigger -- promoting economies of scale and "learning curve" payoffs -- such investment need not increase as fast as revenues. Dollars sown beget many more in return. The yearend figures for 1975, for instance, show that in the last ten years:

- While revenues increased 240% and earnings 280%, net investment in plant, rental machines and other property increased only 130%.

- Yearly capital expenditure increased only 54%; net investment in rental machines and parts (a component of the net investment in plant, rental machines and other property above) increased 66%.

Even so, capital expenditures and net investment seem to follow the same general -- and cyclical -- growth pattern as one another . . . which, in turn, approximates that for earnings-to-revenue. The most pronounced hump in all these curves centers on the introduction of System/360 . . . when overall net investment hit a 20-year peak in growth rate, capital expenditures doubled in two years, to a 20-year peak in growth rate also, and net investment in rental machines and parts also grew at an all-time high.

The largest negative growth rates -- or the biggest cutbacks -- in capital expenditures and net investment occurred during the years 1959, 1968, 1972, and then again just last year.

Future history?

The peaks and valleys of IBM's financial terrain tell a story past -- System/360, two recessions, System/370 and 370VS, third-party leasing inroads -- but do they tell of things to come?

EDP/IR leaves it up to the reader to fair those "future" curves . . . but some things seem clear. First, should IBM announce a new family of computers this year or next, the curves could accommodate the effort. A continued push for outright sales, for instance, might not be the mortgage Watson foresaw in 1969 if a new family were announced. Net investment in rental machines would be lower, income from the rental base thus less to be impacted. Second, earnings and revenue per both net investment and capital expenditures were higher for the Giant in 1975 than in any year before.

So the wherewithal is there. But the exact nature of the next event to put a bulge in the company's curves is for conjecture -- or educated guessing -- only. Meanwhile, there are other mainframers out there. And not only do they have to contend with the implications of IBM's financial curves . . . but they have curves of their own to fuss over:

- As the most profitable and consistent, Burroughs and DEC seem to have their fates well in hand. Both companies are optimistic about profitability in the near term; and both are leaders in bringing new technology to their customer base.

- NCR, riding an earnings tailspin during the last half of 1975, is less well positioned -- and historically more erratic. The bite on earnings

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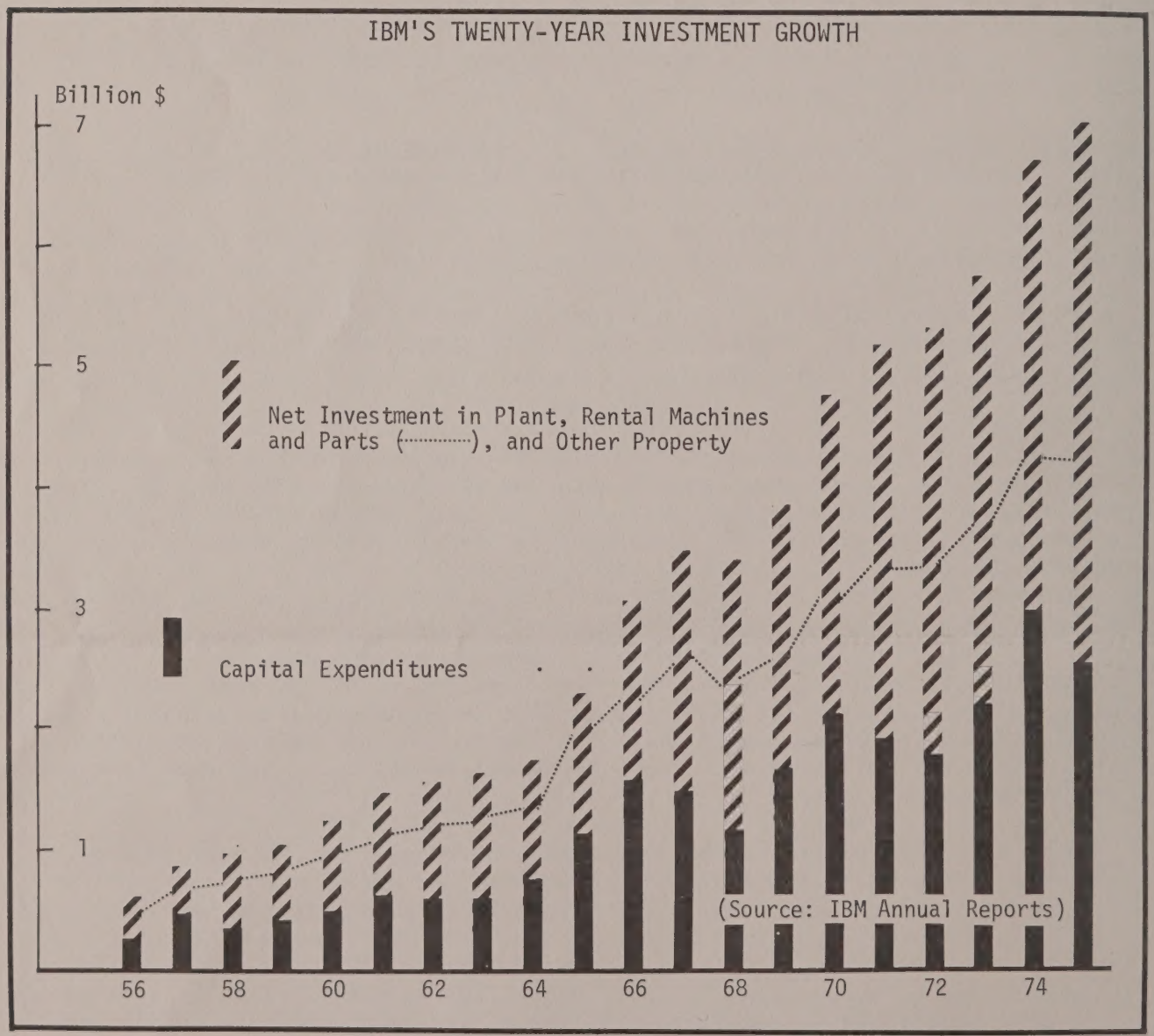
resulted from overseas employment cutbacks and an earlier-than-expected completion of its U.S. phaseout of mechanical production. Making a few assumptions on the economy, NCR sees a "favorable" 1976.

- Honeywell hopes for "modest improvement" in orders for computer systems next year. The company also points out that its liquidity position is "excellent" and that its ratio of total debt to capitalization is down to 37% -- from a high of 52% after the GE acquisition in 1970.

- While Sperry Rand chugs along as a consistently profitable company, its Univac division has been especially shining of late, buoying company revenues . . . and promising to continue doing so on the strength of the new 1100s announced last year.

- Helped by Cyber 170 acceptance and its growing services income, Control Data logged a profitable 1975 after two years of losses. Lease-to-purchase conversions in the computer sector helped. CDC's Commercial Credit arm dropped in earnings, though, affecting overall profitability.



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"Q" for Query?

IBM RESEARCH REPORT: SPOTLIGHT ON QUERY BY EXAMPLE PROGRAMMING

Way back when, before the letters "FS" met their demise as a designation of works-in-progress at IBM, there was talk of a System "Q" operating system to go along with it (EDP/IR,Jan.16,1974). System "Q" would be "usable by people who are not programmers, not professionals, not college graduates or even high school graduates," said System "Q" planners in the Telex documents.

Now, in this year's annual report IBM casually mentions "an experimental computer language called Query by Example" which permits users to extract information from computerized data banks by showing the computer an example of what they are looking for . . . rather than telling it how to look.

As explained in papers at last year's National Computer Conference, Query by Example operates on a "relational model of data" where, initially, data elements relate to each other in a simple and straightforward way -- as would "employee name" to "salary." To users, these relations can be depicted as tables.

To query his data base under the system, a user first identifies the table or tables involved, then essentially fills in the appropriate table row with an example of a possible answer. And for a large class of simple queries, the user need only distinguish between two entities:

- The "example" element and
- The constant element

If a user wanted to find all items in stock which were red, for example, the constant element would be "red" . . . while the "example" element could be any item that filled the bill, such as "lipstick." There are a few format rules for designating the "example" element and output functions. For more exotic queries tables can be linked by "example" elements or joined together into larger tables. Simple functions such as "count" or "sum" are provided, as well.

While the table concept is simple -- almost too simple it seems at first -- some amazingly complex processing functions can be performed through linking and grouping tables and "example" elements. And, in the true spirit of things, the system itself is taught by example rather than rote. In addition, the system is "behaviorally extendable" . . . meaning that novices need learn only a small part of it to write successful queries for simple questions, yet can learn more when it's necessary to answer more complex questions.

Well, is it usable? To find out, IBM researchers conducted tests on nonprogrammers -- and found that it was. "In an absolute sense," said the testers, "it is hard to imagine a more powerful formal language system which could be learned more rapidly that Query by Example." The IBMers felt the language had advantages even over "natural English" query languages because of its tabular concept and lack of ambiguity over commands.

Who would use it? Neither the person who knows his application well and regularly uses the query system as the main part of his job (as in airline reservations systems) nor the casual user or "browser" who might sample information and applications he knows nothing about, says IBM. Instead, it's for the person in between . . . perhaps that nonprogramming original System "Q" candidate?

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• DATA GENERAL'S GETTING INTO THE INTELLIGENT TERMINAL SWEEPSTAKES through the acquisition of Incoterm Corporation. The intended merger, if both boards of directors and Incoterm stockholders approve, will entail a stock swap of two and a half shares of Incoterm for one share of Data General. At the prices prevailing the day before the announcement, that would mean a $38 million exchange.

• REMEMBER THAT NEW IBM 60-MONTH LEASE PLAN? Now its available with a new terminal -- the IBM 5937 industrial terminal. Designed for data collection on the factory floor, the IBM 5937 can operate in temperatures from 33 to 120 degrees Fahrenheit and withstand humidity from 10 to 95 percent. Besides operator input, the terminal can accept direct input from up to 16 remote monitors and can output to up to eight devices.

Keyboard for the terminal doesn't use typical typewriter-like keys, but elastic diaphragm switches with a plastic keyboard overlay that contains the labels for the key switches. Keys are arranged in alphabetical order (it really is meant for a factory floor). The 5937, which looks to a host computer like an IBM 3270, can communicate in bisynch or SDLC. First shipments will begin this summer (SDLC units won't go out for another year). Prices range from $12.5K to $15K purchased, $308 to $444 a month under a 60-month ATP.

• HOPING TO CASH IN ON THE SERVICE BUREAU FRENZY TO OFFER HARDWARE, MSI Data Corporation has announced a new source data (remote) entry terminal. Powered by an Intel 8080 microprocessor, the new terminal -- dubbed SOURCE 7600 -- is quasi-programmable under a permanently programmed simple command language that allows users to create original formats for output data. With the terminal come a journal printer and one cassette drive. A second cassette drive and an external line printer are optional.

The terminals, which cost between $3400 and $4500, can connect to a mainframe via MSI's Data System IV receiver system, which stores the terminal input on magnetic tape from transmission to the computer. The terminals transmit to the Data System IV in asynchronous mode at 1200 bps. One Data System IV costs about $20,000 says MSI not counting line controllers ($2K), which can handle anywhere from 50 to 150 terminals.

MSI, whose data entry terminals are familiar to wholesalers and grocers, hopes SOURCE 7600 will find especial favor with service bureaus that offer remote data entry facilities to their customers. Other markets foreseen are in banking, insurance, lumber and retail industries. The company says it would like to sell 1000 SOURCE 7600s this year, three times that next year. The first units will be available this spring.

• SYCOR HAS A NEW PRINTER -- AND IT'S SMART. Called the Model 4600 Series, and more electronic than mechanical, the 60, 120, and 180 cps printers that comprise the family use a 5K byte microprocessor for real-time control of all system dynamics and data transfer. As a result, says Sycor, the printers conserve host processor resources and, at the same time, provide more flexible and controlled printing. Prices for the units run from $5600 to $8620.

• INTEL CALLS IT THE "SINGLE BOARD COMPUTER" -- alias the SBC 80/10. What is it? Well, it's a small plug-in circuit board for less than $300 which contains an Intel 8080 microprocessor and all the accompanying ROMs, RAMs, clocks, interface and whatnot to make it useful -- and easy to use -- for OEMs needing distributed intelligence in their products. Main feature of the "super component," as Intel calls it, is its all-in-one simplicity . . . a boon to bewildered OEMers.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" FEBRUARY 27, 1976 • VOL.11,NO.14 P.J.McGOVERN,PUBLISHER

IBM WELDS AN EXTRA PROCESSOR ONTO THE 370/168-3
NEW SYSTEM BRIDGES THE GAP BETWEEN UNI- AND MULTIPROCESSING

The haunting question is whether the dynamism of the last twenty years will continue. Or -- are the Rosetta Stone technologies just about out of gas and will the technology engine that propels the EDP Industry sputter and stall? . . . I used to describe the change of technology cost/performance with respect to time as an exponential curve . . . e^{-x} . . . that decreases very swiftly in the beginning, rapidly improving cost/performance, but then the rate of change slows . . . However, the more I work these days, the more I am convinced that for the next several years at least we are not on an e^{-x} curve at all. On the contrary, the rate of change of technology is, if anything, accelerating!

-- Bob Evans, President, IBM Information Systems Division, NRMA EDP conference, 1975

On it goes, the march of technology, ever bringing the user of EDP equipment the benefit of progress -- as knowledge evolves, R&D fruit ripens, and repetition nurtures raw economies. And now, the latest product to "shuss" down the technology curve is IBM's 370/168 "Attached Processor System" (APS) announced last week.

Or is it?

Indeed, to members of the EDP community who had long been buzzing over the possibility of a new large-scale system out of White Plains (178? 188?) -- maybe something with a "fourth generation" sheen to it -- the new system came less as a surprise than a letdown. It seems the educated guessers who called for a 168 "accelerator" had been closer to the mark.

As IBM admits, no new technology is actually involved. An APS is essentially a 168-3 sans main memory tacked on to a host 168-3 that does have all the trimmings. There's a new power and coolant module and some minor adjustments to the host 168-3 to go along . . . but an upgrade can be done in the field. And though the APS at first glance looks to be a multiprocessing system pinned to a single main memory . . . that's not the case. The "attached" part is an instruction processor only and can only operate on machine language instructions; the host machine must handle all data input and output.

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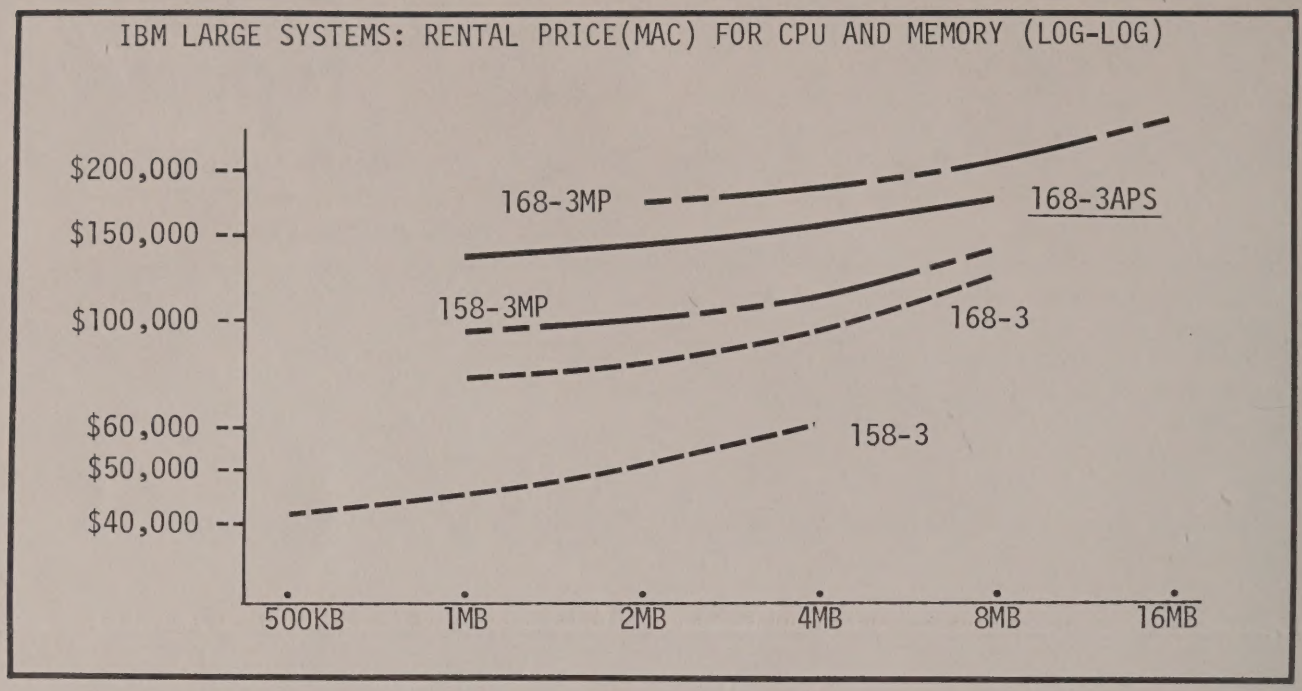

And while the system may "boost internal computing performance as much as 1.5 to 1.8 times that of a Model 168-3 with a single instruction unit," as IBM says -- it does so at 1.5 to 1.8 times the cost. The real "newness" to the system isn't anything intrinsic -- just that it's in the product line-up.

Reaction Processor System?

One of the reasons there was so much speculation prior to the APS announcement -- even Newsweek did a piece on the "Fourth Generation" -- was a West Coast CPU maker by the name of Amdahl. Of late, the company had made some highly publicized -- if not particularly threatening -- inroads into IBM's high-end base, in a way making the Giant look almost silly. When the nation's tenth largest insurance company, Massachusetts Mutual Life Insurance Co. (MMLI), shelved plans for a 370/168 in favor of an Amdahl 470/V6, observers openly wondered how and if the generals in Armonk would react.

But it seems they didn't. When asked if an APS in the IBM product line would have had any effect on his company's decision to go with an Amdahl, Ken Cardwell, a company vice president, says simply, "Negative. No way." A 168 uniprocessor would have easily handled the load, he points out, the problem was its cost. An APS would have been too powerful for the company's needs, "but we got that extra processing power -- and more channels -- with the Amdahl anyway," he adds.

Dr. Amdahl himself sees no threat in the APS. "Effectively it's no different from an accelerator package -- it fits on the old price/performance curve." IBM's system, in his opinion, offers none of the characteristics of a multiprocessing configuration . . . merely more processing for the money. Or, as Cardwell from MMLI put it, it means "more bang -- but for more buck."

For users topping out on a 168, however -- especially compute-bound ones -- the APS may be an attractive upgrade step. One spokesman at a large East Coast insurance company said, "we've got an MP now, and several uniprocessors. If this had come out a year ago, we might have gotten it instead of the MP. And, if we decide to upgrade our uniprocessors, it's still a possibility . . . ."

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UNIT AND A HALF PROCESSING?

IBM's Attached Processor System -- which follows by a year the introduction of the 370/168-3 itself -- basically consists of these key components:

- A 168-3 Model 'A' CPU. This is the old(?) Model 'U' CPU modified to handle the "attached" instruction processor. It includes the standard 168 amenities and the new service processor and 80ns, 32K buffer that distinguishes the 168-3 from earlier CPUs (EDP/IR, 4/30/75).

- A 3062 attached processing unit. This is the above unit stripped of memory and service processor (it shares the host's).

- A 3067-5 Power and Coolant (water) module. In addition, the host's power and coolant module and console must be modified slightly (IBM also recommends a second motor-generator set for the 3062).

The price for a 3062 alone is $53,000 a month under MAC, $1.54 million purchased. An 'A' model 168-3 cost about $2000 more a month than an unmodified 'U' model; a 3067-5 power supply rents for $2825 a month. System software control has been provided for by a minor modification to OS/VS2 Release 3, introduced last year with the 168-3 (and the most probable IBM-written operating system to be used with an APS or MP 168).

While a 168APS cannot be tightly-coupled with another 168 system, APS or otherwise, it can be loosely-coupled in a network where each CPU has an indigenous memory and instruction set and job scheduling is carried on under IBM's JES3 software. According to IBM, users renting a 168APS can migrate to an MP system with no penalty.

Undercutting the MP?

In fact, a number of users EDP/IR interviewed saw the APS as an attractive alternative to acquiring a multiprocessing system. One had even ordered an APS already . . . getting into the pipeline while he evaluated it. (Perhaps to IBM's eventual chagrin, he also had a 168MP on order which he planned to cancel if the APS evaluation was favorable.)

From the comments of IBM 168 users, it appears that the differences between the 168APS and the 168MP are its main selling point:

"-- For the user looking at MP's, this might be the answer. Especially if the number of channels, redundancy, or 8 Megabyte limit doesn't come into play.

"-- Basically it's a very cost-effective use of processing. It's advantage over MP is that it offers more computing power, not just redundancy. (We're, however, more tied up in I/O -- not much of an APS candidate. Our CPU isn't fully utilized as it is.)

"-- Another advantage for a 168 user switching to an APS, is the automatic upgrade to a 168-3 CPU. That in itself can mean a 5-10% increase in processing power.

"-- Do we see it as a direct alternative to MP? Hell yes.

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Has IBM cut off its MP nose to spite its face, then? Probably not. For one thing, the new system may boost shipments of new production 168-3s . . . perhaps more than user migration to the MP systems would. As for memory, users will more or less acquire what they need -- 'X' megabytes -- whether all in one bunch under a uniprocessor of APS, or divided between systems in a multiprocessor.

And what revenues IBM loses on unbought MP systems could well be offset by increased shipments of 168APSs brought on by their lower price. At that, it won't take much. While a 2MB 168APS costs about 1.7 times a 2MB 168-3, a 2MB 168-3MP costs only 1.2 times more than that. (The biggest savings for prospective users will be at the upper end of memory capacity -- where there may well be external factors lobbying for a switch to MP anyway.)

If IBM has filled a real and immediate need users will react and loss of MP revenues may be academic. And if the APS does, in fact, affect Amdahl -- if only in user psychology or impact on future products -- it's gravy.

Play it again, TCAM

In what it termed an unrelated announcement, IBM introduced some operating system improvements along with the 168APS. There were three basic enhancements, all related to telecommunications access under virtual storage:

- Virtual Telecommunications Access Method (VTAM) is now available for users of OS/VS2 Release 1.7 -- who were previously unable to communicate directly with such SNA terminals as the 3270, 3770, and 3790.

- OS/VS2 users can now use VTAM alone for access to applications running under TSO as well as the recently announced VSPC (EDP/IR,Jan.30,1976) and data base/data communications programs CICS/VS and IMS/VS. Previously, TSO could be accessed only via TCAM.

- OS/VS1 and 2 users of TCAM will now be able to communicate directly with selected SNA terminals without using VTAM.

While IBM says the enhancements "extend to a broader range of users the advanced function of terminals that operate under Systems Network Architecture (SNA)" . . . the enhancements may in fact have been prompted by user unrest. VTAM -- introduced as the virtual storage and SNA replacement for TCAM (also BTAM and QTAM) -- has been in the field less than a year for OS/VS2 users. And although most of the more sophisticated users will probably migrate to it eventually . . . the early birds have experienced some growing pains.

Meanwhile, for the more cautious users now under TCAM -- many of whom would undoubtedly like to expand their terminal fleets with the new SDLC offerings -- a switch to VTAM may represent too much of a gamble right now. Hence IBM's concession to the tried-and-true?

International Data Corporation, incidentally -- even before the SNA blessing of VTAM -- had forecast that by the end of 1976 over a third of the users with 270X, 370X, ICA, Memorex 1270, or independent communications controllers would be switching to VTAM. And the largest cuts in access methods which were prevalent at the end of 1974 would be felt in the TCAM and BTAM base. With VTAM now the darling of SNA, it's probable that even more users will make the switch . . . but not, it seems, without a squawk.

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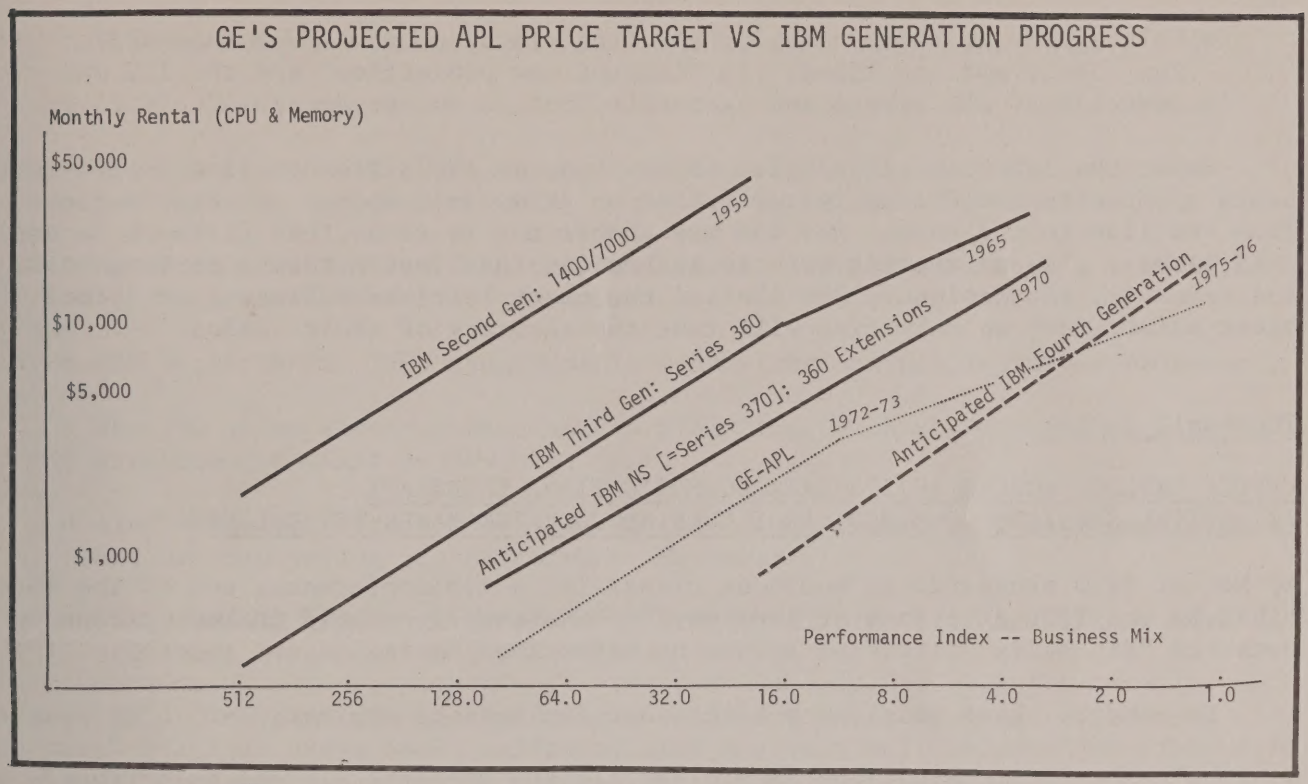

In search of e^{-x}

The chart above is taken from documents revealed at the IBM antitrust trial, and it shows GE's representation of the progress from one computer generation to the next. It was put together before System 370 was announced, so the Gibson mix values may well be off the mark. It's shown here for the curious . . . and to illustrate one common characteristic of computer generations: the quantum jump in price performance from the generation before.

And that quantum jump leads us back to the 168APS and the question, "whither the fourth generation?" Phrased another way, "how long can IBM prolong the 370?" For speculators, EDP/IR presents the following points:

- The 3062 attached processor -- the part that makes the 168APS what it is -- has a purchase/rent ratio of 29. Factored in to the price of a 168APS it brings the ratio to 40; the 168-3 ratio was 46 last year.

- Pricing to promote outright purchases increases revenues (EDP/IR,Feb.13, 1976) . . . and also makes a rental base less susceptible to impact from its own follow-on product line. Attrition of the 168MP base to a smaller product might prime the market for a system larger than the 168MP.

- The concept of computing "engines" -- possibly a feature in the next IBM generation (EDP/IR,Nov.6,1975) -- may have a predecessor in the piggy-backing of 168-3 instruction processors.

- The evolution of OS/VS2 software -- Release 1 providing a total of 16MB virtual storage (SVS), Release 2 providing each user or program 16 MB of virtual storage (MVS) and MP capabilities for 158s and 168s, and Release 3 providing for loosely-coupling up to 7 CPUs in one job stream -- is going somewhere. SNA groundwork is being painstakingly laid.

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- Only three 370 models are in "new production" — the 168-3 (and APS), the 158-3, and the 115-2. In "limited new production" are the 135 and some 145s. All others are currently "not in new production."

While the 168APS at face value fills a gap in IBM's product line -- one that users apparently would like to see filled -- it doesn't appear to make the leap from one line to the next. But IBM may choose not to cross that distance in one fell swoop . . . and there's more to technology than just hardware improvements. And remember, the designers who plotted the chart left the business, or joined other mainframers so only time will test the accuracy of their vision.

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Thumbnail review

EVENTS EXPLODE ACROSS 1975'S DATA COMMUNICATIONS LANDSCAPE
AS DIGITAL SERVICES COMMENCE, PROTOCOLS ABOUND, FCC MAKES KEY RULINGS

By NCC or INFO standards it would be classified a miniconference, but to the 45 exhibitors and 1250 attendees at last week's DataComm 76 -- held in New Orleans on the banks of "Big Muddy" itself -- it was of major importance.

No wonder. Last year was a hectic one for data communications. Long-awaited plans were implemented, theories put into practice. Some argue that the "next generation" of telecommunications technology hit the streets. It was this frantic pace of change, more than anything else, that kept users so attentive to podiums, so inquisitive on the convention floor.

For the datacomm industry, 1975 came in like a lion . . . AT&T had just fired up its Digital Data Service (DDS) in the first six cities; the Justice Department had filed its antitrust suit . . . IBM had announced its Advanced Function for Communications (SDLC had already surfaced in the 3600 Banking System); COMSAT had become a bedfellow in a domestic satellite proposal.

During the year, computer users spent more than $1.3 billion on line charges, another $670 million on modems, multiplexors, and other datacomm gear -- to post a 1975 growth rate almost twice that for overall EDP spending.

And the year held true to its promise of frenzied activity. Month by month, 1975 saw the major events roll by like this:

+ The FCC restricts IBM and COMSAT in their satellite plans -- *January*

+ Datran's "Datadial" switched digital service begins -- *February*

+ DEC announces DECNET and a line protocol similar to SDLC -- *April*

+ Burroughs announces its answer to SDLC, called BDLC -- *July*

+ IBM enhances its 3790 data communications system, appearing to bless the distributed computing concept -- *July*

+ Commercial packet-switcher Telenet goes on-line -- *August*

+ Aetna Life Insurance joins COMSAT and IBM in plans to offer a satellite communications system -- *September*

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+ Telenet asks the FCC to sanction Tymshare's TYMNET -- *September*

+ AT&T's DDS is expanded to 19 more cities, for a total of 24 -- *October*

+ The FCC approves Western Union International's plan to offer an international digital network using cable and satellites -- *November*

+ An intrastate Pacific Tel. and Tel. packet-switching network's tariff is approved in California -- *November*

+ IBM upgrades its 3705 programmable communications controller -- *November*

+ The FCC okays direct connection to AT&T lines without Direct Access Arrangements (DAA) -- *November*

+ AT&T comes out with a Dataspeed 40 that communicates in synchronous mode and has clustering capabilities -- *November*

+ IBM, COMSAT, and Aetna propose an all-digital satellite network featuring local transmission and receiving -- *December*

+ IBM, CBEMA, and the CIA oppose the Dataspeed 40 as DP gear -- *December*

+ ITT proposes a nationwide packet-switched network -- *December*

Judging from the first two months of 1976 the pace will continue. AT&T's Dataspeed 40 is still mired in controversy . . . Milgo has just sued AT&T, Western Electric and Boeing over modem patents . . . the FCC has issued a report calling for the weaning of Western Electric from Ma Bell . . . the interconnection flap over DAAs shows no sign of letting up.

And so it goes. The signs -- and scars -- of change are evident in the business. As the past 14 months show -- and as datacomm users and DP staffs are finding out -- one thing is certain. Computers and communications are heading for the alter -- kicking and screaming it seems sometimes -- but heading there nonetheless.

IMPLEMENTING SYSTEMS: THE PEOPLEWARE INTERFACE

Sessions like those at last week's DataComm 76 tend to be pragmatic information exchanges -- these are the machines we used in our system, here's how we solved that software hangup, etc. -- nuts and bolts stuff.

There was little different at first in the talk by Larry Brons. As a datacomm specialist working on Pacific Tel. and Tel.'s packet-switching project for California, he talked about his network -- how it was conceived, what it was trying to do, how it worked and so on. But then he digressed

"You know, the biggest problem in implementing a system like this is people. There's a lot of resistance -- and you have to overcome it in the right way. You can't consider the project as yours alone -- you've got to disentangle your ego." People, he felt -- not this message switch or that software routine -- would be the cause of the system's ultimate success or failure. *"In implementation, process is more important than product."*

It was a rare communication in an industry devoted to the subject.

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• INTERCEPTED FROM THE SCEPTERED ISLE: ICL HAS A NEW 2903, a smaller version called the Model 20. It comes with 16K words of main memory, two direct data entry stations, 10 million words of disk storage, a 300 cpm reader, 150 lpm printer and console. It's aimed at the first time user, says ICL, and though the Model 20 per se won't be marketed in the U.S. (price: $40-90K) its major cost benefits will be incorporated in 2903s marketed here. The British company this month logged its 1000th worldwide 2903 delivery, order take approaches 1500.

• HONEYWELL'S RUNNING A SPECIAL ON A SERIES 6000 SYSTEM, calling it the Model 6031. The package consists of a nonextended instruction set processor with 131K words of memory, console, disk subsystem with 4 removable disk units, and other I/O peripherals. Price for the whole kit'n'kaboodle? A low, low $432,800.

• MEMOREX IS GUNNING FOR THE GIANT'S 3270 BUSINESS with its 1377 Display Station, the company's first entry in the video terminal market. Besides standard 3277-2 features, the Memorex unit has a tiltable screen, system status indicator and faster CRT refresh -- which cuts screen flicker. A two-year lease begins at $110/month, purchase prices at $3800. This, says Memorex, is under the IBM price and a major reason users will find the 1377 attractive . . . that and Memorex's demonstrated ability in data communications.

• YOU FOLKS GETTING INTO SUPERMINIS WILL NEED A PRINTER, RIGHT? It's a rhetorical question to Dataproducts Corporation, which has announced a 900 lpm printer called the 2290 "designed to meet the requirements of the new high-performance minicomputer-based systems." Says the company, it provides operating economies for medium- and large-scale business DP systems, distributed processing, and remote terminals at 9600 baud and up -- at close to half the cost of current, higher speed printers.

Key to the 2290's hoped-for success is its reliability predicated on field-proven technology . . . meaning the 2290 is built upon other members of the Dataproducts family. These include the 2230 (300 lpm) and 2260 (600 lpm). The OEM price for a top-of-the-line 2290 is under $12,500, 120 days ARO.

• FROM GIANT OAKS, ACORNS GROW: CDC's 2550 communications front end, used with CYBER 170 computers, is now available for use with CDC 3000s. The processor features 32K 16-bit words of memory and can control 32 communications lines. Continuous data rate is 10K characters/second. With attendant couplers a 2550 system rents for about $1500/month on a three-year lease, costs over $60K.

• WELL, PHOTOGRAPHY IS INVOLVED IN SEMICONDUCTOR MANUFACTURING, and now Kodak is getting into the business . . . but only on a very limited scale for internal purposes, says the Rochester film maker. First reports that the company will begin making its own ICs were blown out of proportion, says Kodak. The company is in it only "to learn the technology and benefit our customers."

• THIS WILL BE A BIG YEAR FOR NEW SYSTEMS says William Anderson, Chairman and President of NCR. Now that the company has completely phased out its mechanical production ("You might compare it to an automobile manufacturer going out of that business and into an entirely different business") the company is poised to announce a new computer family. The "new generation" systems, as NCR calls them, will be Century-compatible and designed for use in a transaction-oriented environment. NCR declined to comment on whether the new systems spring out of the company's joint mainframe development program with CDC. Could be.

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"THE GRAY SHEET" MARCH 12, 1976 • VOL.11,NO.15 P.J.McGOVERN,PUBLISHER

Users ponder mass storage

IBM 3850 SHIPMENTS AND SHAKEDOWNS START TO ROLL
ALMOST A THIRD OF LARGE 370 SITES EXPECTED TO INSTALL BY 1978

It's almost as if IBM just wanted to let the world know the thing works . . . for the press release out of Gaithersburg, MD, last week was scant. About all it said was that the first delivery model of a real live IBM 3850 will be used by NASA to store up to 169.1 billion characters of information on such exotic experiments as "deep-space views of stars and planets" and the "measurement of cosmic rays."

The unit -- shipped last September and formally accepted before Christmas -- is to be the main memory bank of an on-line telemetry processing system that IBM's Federal Systems Division is putting together for the Goddard Space Flight Center. FSD officially won the bid in November, 1974 -- a month after IBM announced the 3850 -- in competition with Univac and Aeroflot General. The turnkey system, dubbed TELOPS, will be powered by two MVS 370/145s, and, counting several million dollars worth of software, will cost NASA about $8.3 million.

So the 3850 works . . . users evaluating their mass storage requirements and sweating over ways to fill them will at least be glad to know that.

But the Goddard installation is atypical . . . TELOPS is being built from scratch for a specialized application, and the 3850 was just part of a larger system bid. A "real" 3850 would have to justify itself in the harsh light of day-to-day economics . . . fitting into a business plan and vying with business-as-usual under on-going tape and disk systems.

How and why, then, will a typical 3850 find its mark? What reasons will compel users to install one or not? Who will migrate? How will the behemoths be put to work? Competitors of IBM, analysts, PCMs, media suppliers, other users, and perhaps even IBM would like to know.

In a recent survey of approximately one in every eight computer users eligible for 3850 use (370/155 and up), International Data Corporation, publisher of EDP/IR, asked just those questions . . . and made the following observations:

- The first and foremost justification for getting a 3850 is immediate cost savings -- mostly through decreased tape and disk usage. Personnel cutbacks or displacement are also important. Users who find they

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have to cite increased performance to show savings over current systems are harder pressed to justify it, more likely to be "undecided."

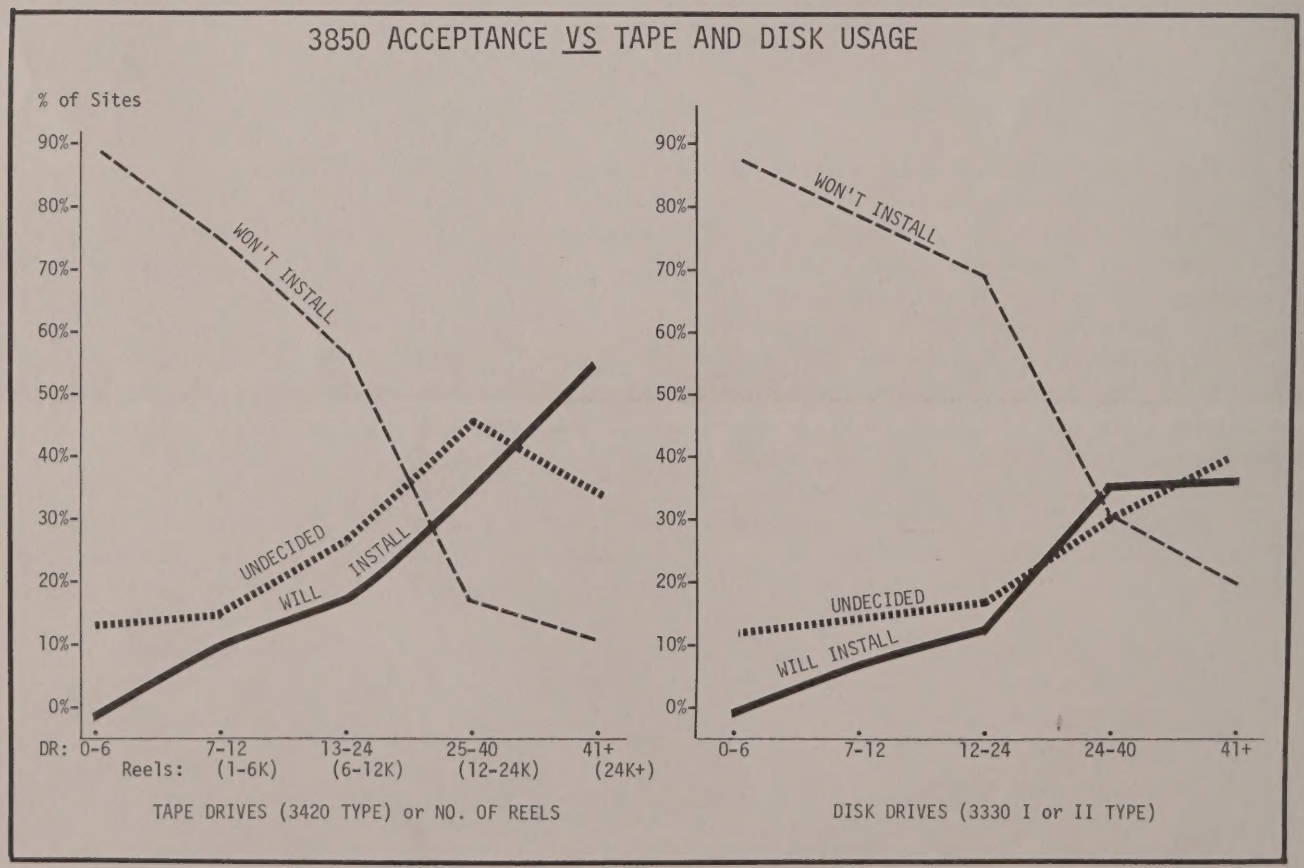
- The major fear users have of installing a 3850 is its reliability -- several had been burned on IBM's 1360 "Data Cell." A majority of the users knowing which model they would install or order opted for a system having a backup controller.

- A surprising number of users definitely planning to install 3850s -- over a third, in fact -- were not yet operating under VS. Several were switching just for the 3850. In general, the bigger the computer and the more systems at a site, the more likely a home for a 3850.

- Almost to a site, users will be putting their 3850s to work on current applications first, gaining the tangible cost savings as soon as possible . . . but criteria for choosing which applications vary widely.

Now that the 3850s are making their way into the field some of the users' qualms about the systems may be put to rest. Perhaps others will be justified. But NASA says its 3850 (Model B3) startup went well . . . with only the usual new product problems. As one spokesman quipped, though, "of course, when anything did go wrong, those guys were all over it like a swarm of locusts." (Such may not be the case when a few more are out there.) One early (perhaps the first) commercial user -- Lockheed Aircraft -- reports similar startup success.

But besides giving tire kickers something to kick, the first 3850s serve another purpose . . . they're a reminder from IBM that the path along MVS toward whatever evolves is a methodical one. Keystones are being put in place.



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Selling the boss

The 3850 is primarily a replacement for tape drives -- offering in one system what the Giant says is equivalent to up to 47,200 reels of tape storage with an average 10 MB per reel. IDC, therefore, took a look at the relationship between the size of a site's tape system and the likelihood of 3850 installation.

Clearly, the more tapes and tape drives a site has, the more attractive an automated storage system is bound to look . . . however, not all big tape users will automatically migrate, probably as a function of applications. But the users who do plan to install 3850s expect to displace about 42% of their 3420s (or independent equivalents) reducing an average of 33 drives per site to 19.

With the direct cost savings of tape drive displacement come the secondary savings in "tape hanger" and tape librarian salaries. Of the users surveyed, 60% expect displacement of personnel when -- or if, among the "undecided" -- their 3850 arrives. Almost surprisingly though, 24% said there would be no displacement . . . including a substantial number of users with very large libraries and acres of tape drives. Among the users with 30,000 or more reels of tape, for instance, almost 30% said that no people would be affected, another 30% said only 1-4 would be. Displacement, in any event, doesn't always mean layoffs.

The chart on page 2 gives the percentage of sites having a certain number of tape drives (or reels in a library: the correlation was close) that will install, won't install, or are undecided about a 3850.

A similar tabulation is shown for disk drives, but fewer sites are expected to justify their 3850s primarily on disk savings. (Lockheed reports, however, that it will return four 3330s now, perhaps as many as ten as time goes by). The fact that the more disk drives at a site the more likely it is to install a 3850 is probably more a function of storage and access requirements. Sites that need disk-speed access to large data bases will probably need it even with a 3850.

Data set dilemma

Said IBM in a paper presented at NCC last year: "The total cost of the Storage System is dependent on the size of data sets, their reuse characteristics, and the amount of data that must be transmitted to and from the CPU's main memory." Thus, which data sets are included in the Mass Storage hierarchy when it's implemented may definitely affect the system's performance and perhaps configuration.

And here IDC found conflicting lines of reasoning from users on which data sets to include. Some wanted to put small data sets on (i.e., one reel or less)

3850 INSTALLATIONS -- 12/75-12/77

	12/75	12/76	12/77
# of Large 370 Sites	1,275	1,400	1,440
% with 3850	1.2%	13.2%	31.3%
# Sites with 3850	15	185	450
# 3850s Shipped	15	170	265

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to reduce the constant handling problems associated with the smaller jobs. Other users argued that larger data sets (5 reels or more) should go on the 3850 and act as an on-line data base.

A second major consideration is the frequency of data set use -- many users consider this even more important than data set size. But then, again, there was disagreement over what was "frequent" use and what was not.

And actually the problem is much more complex than that. In its NCC paper, IBM pointed out that one of the major factors affecting 3850 effectiveness is the amount that data staged onto disk is reused . . . a factor that can vary from one application to another. If the system is designed right, says IBM, then "maximum reuse potential must be achieved." With that in mind, IBM feels a properly configured 3850 will compare to manually mounted tape/disk where data sets are less than 50 MB and where reuse characteristics are present. For users, such comparisons are relatively straightforward. But the use of 3850s in "interactive data base applications, however, needs considerably more understanding in most cases."

March of the memory elephants

Whether or not the 3850s pry open any markets for competitive systems remains to be seen. CDC's 38500 (EDP/IR,June 19,1975) was the rival most often examined by 3850 prospects (though non-VS 370 users may be even more interested). Other than that, Storage Technology's "super disk" was most often mentioned. In some cases, then, the advent of the 3850 has prompted eligible users to do some comparison shopping. But meanwhile, the 3850 has probably ushered such mass storage anomalies as Grumman's MassTape and Precision Instrument's Unicon into oblivion.

What next? With the first 3850s now lumbering into the user base, perhaps IBM will spread the technology further . . . with a smaller version of less mammoth capacity and less mammoth price. For the smaller users are a large market . . . and one which can adhere to MVS and the IBM philosophy just as loyally as the boys in the big CPU brackets.

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All the news that's fit to automate

AUTOTRANSACTION STRIKES THE NEW YORK TIMES NEWSROOM;
HARRIS LANDS CONTRACT FOR THE TURNKEY, 325-TERMINAL SYSTEM

Well, another time-honored stereotype is about to be retired. That New York Times reporter clacking out pulitzers on an old mechanical typewriter -- picture the sleeves rolled up, phone cradled on one shoulder, cigarette dangling -- will soon be laboring over a CRT terminal. The newsroom's going computer.

Though other newspapers have automated their newsrooms before, the New York Times is king . . . and by automating, lends its stately imprimatur to a fledgling concept and burgeoning autotransaction industry.

The automated news processing system -- "electronic newsroom," as supplier Harris Corporation calls it -- is a last step in the paper's phased switch from hot-metal to photocomposition ('cold type') production. And for any paper, says a Times spokesman, that's a major change . . . one that will affect the organization from top to bottom. The paper's display and classified advertising -- about 70% of the paper's processed copy, says Harris -- is already automated.

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Phase one of the newsroom system will be the installation of a Harris 2500 system by May 1 consisting of:

+ 48 Harris 1500 Video Typewriters
+ 2 System Controllers (PDP-11/35s, 64KB each)
+ 8 disks @ 2.4 MB (DEC)
+ Harris-supplied software
+ numerous slow-speed line printers for hard copy

This subsystem will be used only to edit wire copy from the wire services, Times news bureaus, and copy input directly from the Times phone reporting room. The ultimate system -- estimated to be worth $3.5 million, with 325 terminals and 10-12 controllers (2 dedicated to the data base) -- will be used for copy input from Times reporters as well as editing from the wire services.

By using the automated system and switching to 'cold type' the Times expects drastic savings in the typesetting room (about 800 keyboard people now) and in the proofreading department (about 200 people). Other benefits are later deadlines, elimination of typos . . . and positioning for further automation.

Industry in the bud

In an industry that will sell $20 billion of data processing equipment and services this year, Harris Corporations $3.5 million system at the Times is just another drop in the bucket. And even within the subcategory of application-unique terminals -- with 211,000 devices worth $861 million going to autotransaction customers this year -- it barely registers.

But minor as they seem in the macrocosm, the Harris system and the automation of the New York Times are a good -- almost textbook -- example of the autotransaction process. And, in that high-visibility area where people and computers interact, it's a glimpse of an industry aborning.

So, with the New York Times as case study in a hypothetical textbook, we look for some basic tenets for autotransaction (AT) suppliers:

Pick a high growth industry. Not only are application-unique terminals as a whole expected to grow about 40% a year from now until year-end 1980 (to 2.3 million devices, worth $10.2 billion installed) . . . but the subcategory for terminals in currently undeveloped applications is expected to grow even faster. A viable member of that "other" category may expect to see installed base grow from 20 to 30 times its present size. Harris, incidentally, estimates it has about 2500 terminals (1500s, 2200s, 1600s) installed now . . . about 35-40 newsrooms in one stage of automation or another.

Do one thing, do it well. For smaller companies (or divisions of big ones) success often means finding the proper niche . . . one right product at the right time. In autotellers, for instance, it's Docutel, in portable data entry it's MSI. Harris' industry-specific expertise traces to the old Intertype Corporation, which linked with Harris-Seybold Co. in 1957. With that connection, Harris has a long-time involvement in the newspaper business . . . one that stretches from the newsroom through typesetting to printing and binding. It's a good base.

Get in on the ground floor. The two pioneers in "electronic newsroom" concept are Harris and Hendrix . . . the latter with a bigger, more sophisticated

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system first installed at the Detroit News in 1972. But Harris, with a smaller, more modest system may be better primed for expansion to market needs. Its first "electronic newsroom" was installed in Florida about when the Hendrix went in; its biggest, up-and-running system went to the Baltimore Sun in 1974.

Establish credibility. Autotransaction markets grow fast and product success is often consumer related . . . AT products are notoriously visible to the public. Once a product is accepted, though, a snowballing effect can occur. Harris' bagging the New York Times has ramifications beyond the immediate dollars involved.

Don't languish, follow up. It's a purchase business, and AT products often have short life cycles . . . technology can rapidly overtake existing products, rental bases don't have to be protected. Harris already talks of enhancements to the Times system not yet announced; and the newspaper hints that anticipated future developments were much a part of the decision to go with Harris. (For the Times, the next step would be automation of page layout, and later, perhaps, hook-up to the Times Information Retrieval System.)

Take care with implementation. Since any AT product generally has to interface with the public, implementation may depend to a great deal on human factors. Resistance to change and fear of "the computer" can wreck a project . . . thus the Times' phased implementation, thus the automation of the newsroom last. And long before the system itself was chosen, the Times laid the groundwork by working out automation terms with the appropriate unions.

Another clue to the AT side of life is this: although neither the Times nor Harris would say for a fact, one of the major competitors bidding on the project was probably DEC -- which makes much of the hardware in the Harris system. But without the extras a true autotransaction supplier must have, the mini industry leader missed the boat. The key is software and knowledge of the industry.

THE OTHER SIDE OF WORDPROCESSING

While Harris is melding the written word with computers in one way, other vendors are electronifying the language in another. Two recent unrelated developments in the word processing industry:

DEC has announced a word processing version of the Datasystem 310, formerly a mini-based small business system. The 310W, as it is called, will use dual floppy disks for storage (up to 100 pages of text), CRTs for input, and a 45-cps printer for output. The 310W can also function as a data processing machine, programmable in DEC's DIBOL under COS-310 operating system.

Though one might think such DP lineage would be a plus for a word processing system -- after all, isn't the office of the future going to be connected to the computer room? -- DEC may have a little trouble selling the system's split personality. But by aiming at small -- and presumably flexible -- users and launching a new business from an on-going customer base, the minimaker may have averted some of the worst of the startup headaches.

Xerox has introduced the long-awaited communicating typewriter at the top of its 800 electronic typewriter line. The new system can send and receive information over the phone lines at 120 characters/second and can output (as can the mute 800s) at 350 words a minute in automatic playback. The system will be marketed with either single or dual magnetic tape cassettes.

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THAW AT THE CIA?

At a seminar in New York this week, CIA president -- and normally firebrand IBM critic -- Jack Biddle lamented the counterproductive nature of the government's attempts to deal with IBM's immense market power. He mentioned the trial's glacial pace, the debilitating effect of uncertainty, the eventual possibility of government regulation . . . his was a common lament. But then, in an uncommon spirit of compromise for the CIA, he outlined a six-point proposal "to see if there isn't a way that we might all come out from under the cloud of litigation and mistrust, and get on with the business of building an industry that is second to none worldwide." The points -- to which IBM had no official reply by press time -- entail the following:

- Full Disclosure of Functional Interfaces and Protocols -- de facto standards set by IBM by virtue of its monopoly power limit a user's options or competitor's chances when only IBM can manufacture to the standards. Biddle doesn't ask that IBM reveal proprietary design information on devices, just what's required to interconnect.

- Recycling the User's and Shareholder's Capital -- on the one hand is a cash-rich IBM looking for investments, on the other is a capital-hungry user base shopping for DP equipment. Biddle proposes the set-up of a "Computer Industry Acceptance Corporation" (CIAC?) as an industry-wide financing arm. With $2 billion from IBM's cash reserves, the organization -- using ordinary leverage -- could finance up to $8 billion in user leases for computer equipment, IBM's or otherwise.

- Total Unbundling of All Products and Services -- "We believe that vertical markets can be created within IBM short of a massive breakup of the corporation and its integrated activity." IBM would be required to separately price all functional components . . . perhaps even down to the semiconductor level.

- Elimination of Questionable Business Practices -- this would be an agreed-upon code of ethics, workable and enforceable, to standardize business methods and eliminate such problems as announcement of non-existent products, withdrawal of services for invalid reasons, etc.

- Barred from Participation in the Data Services Business for an Additional Ten Years -- the computer services business is thriving and should be allowed to continue to do so.

- Barred from Participation in the Communications Business -- the spectre of a company as both a common carrier and DP manufacturer is immense with anticompetitive possibilities. But Biddle wouldn't deny IBM full rights to manufacture communications equipment.

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If the U.S. Government desires to move further in helping competition in the computer industry, it could follow the inventive solution implemented by the Japanese government and sponsor the formation of a pool of capital for the purchase of data processing equipment to be rented to customers. Or, it could provide the tax incentives and new accounting regulations that would encourage third parties -- including banks -- to do the same.

-- EDP/IR statement to the New York Times
reprinted in EDP/IR, February 22, 1972

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• HELLO, MR. CHIPS! said Data General last week in announcing a new microcomputer family called the microNOVA based on Data General's own LSI chips first introduced with the NOVA 3 last fall (EDP/IR,Nov.24,1975). The family centers on a 16-bit CPU with a 960 ns memory cycle time and NOVA architecture and instruction set. Other chips available include an I/O controller and a 4K RAM.

DG will be selling its micro in four levels of sophistication, starting with unadorned chips at $95 a CPU (OEM quantities). One step up is the board level: CPU and 4K memory for $950. Third is the "box" or minicomputer level, where a CPU, chassis, 4K RAM, and operator panel and power supply cost $1995. At the apex of the tier is the microNOVA "development system" -- CPU, 16K memory, dual diskettes, and more -- for a unit price of $12,265.

What gives the microNOVA an edge on TI, DEC and Intel offerings, says Data General, is that it's integrated into a full mini family and made by a minicomputer manufacturer. Thus, microNOVA buyers will get minicomputer software and support at microcomputer prices. Data General expects many OEMs to start by buying a development system then integrating downwards to chips.

• AND THE SOUTHBORO MINI (AND NOW MICRO) MAKER got an annulment this week: the merger with Incoterm (EDP/IR,Feb.13,1976) is off.

• AFTER TAKING A BATH IN THE GULF, WYLY has sold its insurance subsidiary -- Gulf Insurance Company -- to Commercial Credit Corporation for $30 million in cancelled debt. Between losses on Gulf and Datran last year, Wyly landed $52 million in the red. Gulf, said Wyly, was responsible for about $34.5 million of that.

• GE IS BACKING OUT OF HONEYWELL'S COMPUTER BUSINESS by exercising its option to reduce ownership in HIS (EDP/IR,Oct.24,1975) from 18.5% to 11.7%. In return, GE will get 800,000 shares of Honeywell common stock -- over twice what it held at yearend 1975. GE's remaining interest in HIS can be exchanged for more Honeywell common stock until mid-1979 under terms established when Honeywell acquired GE's computer business in 1970.

• IF YOU'D RATHER SWITCH THAN FIGHT, SAYS SPERRY UNIVAC, we've got some new software for you. First is for Sperry Univac 90/60 and 90/70 users that emulates the IBM 360 and 370 DOS environment. With it, says Sperry, batch programs for DOS users can be run directly on 90/60 or 90/70 hardware without having to wait for data or program conversion. In addition, tape and disk files are compatible so users can upgrade to those systems, too.

For IBM DOS/VS users, Sperry also has software products to facilitate a switch to its VS9 operating system. VS9 can handle batch, interactive, and transaction processing as well as DMS/90 data base management. Language conversion is offered for COBOL, RPG, assembly language and Fortran. Last fall Sperry announced conversion aids for Honeywell 200/2000 users wishing to switch to its popular 90/30 system.

• CITING HAVOC IN THE BANKING INDUSTRY caused by "the game of running to the Comptroller of the Currency by commercial banks when their requests are rejected by the Federal Reserve Board" . . . ADAPSO last week called for the elimination of the Comptroller's powers. With banking regulation consolidated under one roof, hopes ADAPSO, bank services could grow in a more mature fashion . . . in the ultimate hopes that "it would result in a substantial diminution of bank marketing data processing services."

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MARCH 26, 1976 • VOL.11,NO.16 P.J.McGOVERN,PUBLISHER

Spending rebound

USER SPENDING TO TOP $30 BILLION THIS YEAR AS BUSINESS CLIMATE IMPROVES, SYSTEM UTILIZATION STRETCHES

A year ago when we forecast in these pages "moderate real growth" for 1975 user spending in EDP, the phrase seemed almost too optimistic. No one at the time knew for sure that the recession had bottomed out, and a lot of EDP customers were suffering. The prospect of the computer industry making it through relatively unscathed ed was good . . . but bets were being hedged nervously. As it happened, users spent about as expected and EDPers weathered the storm pretty well.

And now there's a new look on last year's worried faces (the Dow break 1000 within a year?) and "moderate real growth" is a little too stodgy for what users have in mind for 1976. According to IDC, publisher of EDP/IR:

- Total user spending for EDP products and services will top $20 billion, another $10 billion will go for salaries.

- Spending in 1976 will jump 17% over that in 1975; only 4% of that increase will be due to inflationary factors.

Overall EDP spending growth for 1976, then, will be about what it was in 1974 . . . which "was a very good year for the computer industry and a very good year for investors in computer company stocks," reminds one IDC vice president. This spending growth will come despite the fact that EDP markets in some major capital goods industries are still depressed . . . which, as the recovery continues, actually bodes well for spending in 1977 and beyond. Meanwhile, 1976 promises to be a dynamically active year . . . a good one for the business.

Fueling the basic user demand for EDP -- besides the brighter economic outlook, easier money, etc. -- are such factors as:

- Applications momentum -- while users may defer applications, as fully two thirds of IDC's sample did during 1975, they can't axe them completely. The phasing-in of major applications, especially in the data base and teleprocessing areas, is a vested process . . . the end product of a long-range commitment and a belief that more sophisticated use of EDP will save money in the long run. As reported in a preliminary survey of 1976 spending plans at year-end (EDP/IR,Dec.31,1975)

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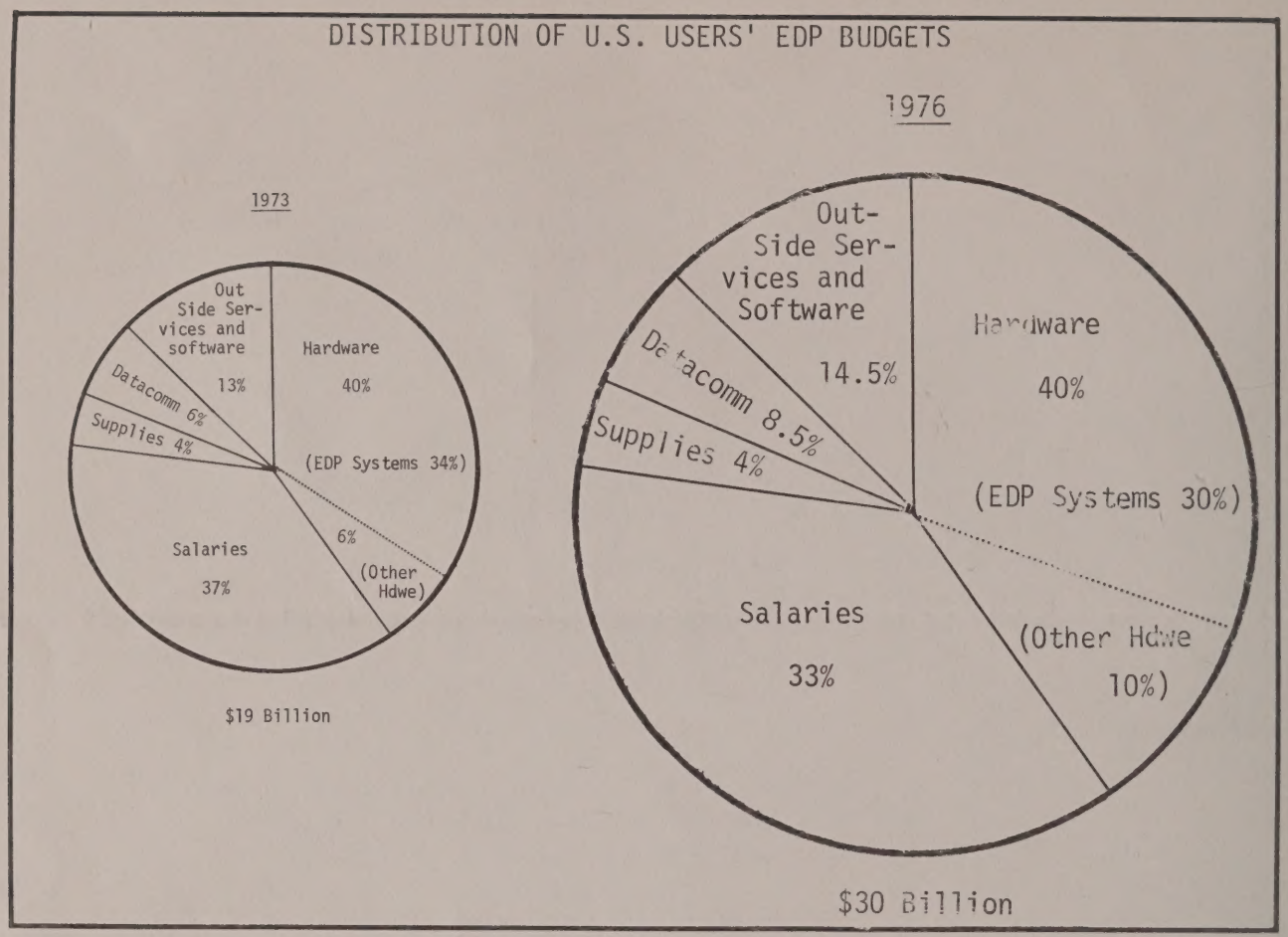

it looks like applications development is back on track once more, and that user budget pressures have eased (and that preliminary survey is actually turning out to have been conservative).

- A busy equipment base -- computer utilization is averaging almost two shifts a day now for medium-scale users, another half shift more for large-scale users. IBM and Burroughs systems are especially strapped, with the Giant's computers at medium-scale sites averaging 15 (out of 21) shifts a week, up one shift from last year. Increased demands on the systems from the new applications mentioned above, then, will necessarily lead to new acquisitions.

- An elongated product cycle -- users are currently opting for current-generation equipment, apparently confident that IBM's next generation will either be longer in coming than once anticipated . . . or not so necessary to adopt in a hurry. Users see the 370, with the help of such pick-me-ups as the 168APS and continual MVS software releases, as sufficient for their needs over the next five years or so. For example, of the top 25 IBM user sites interviewed by IDC last month, 37% will acquire at least one 370/158 or 168 over the next two years. An additional 21% are considering such a commitment!

(To determine user spending patterns, IDC continually monitors a specially-structured model of the computer industry and then extrapolates results to the real world. The model consists of 63 large-scale users from the "Fortune 500" -- the leading edge data processors and representative of 35% of the installed

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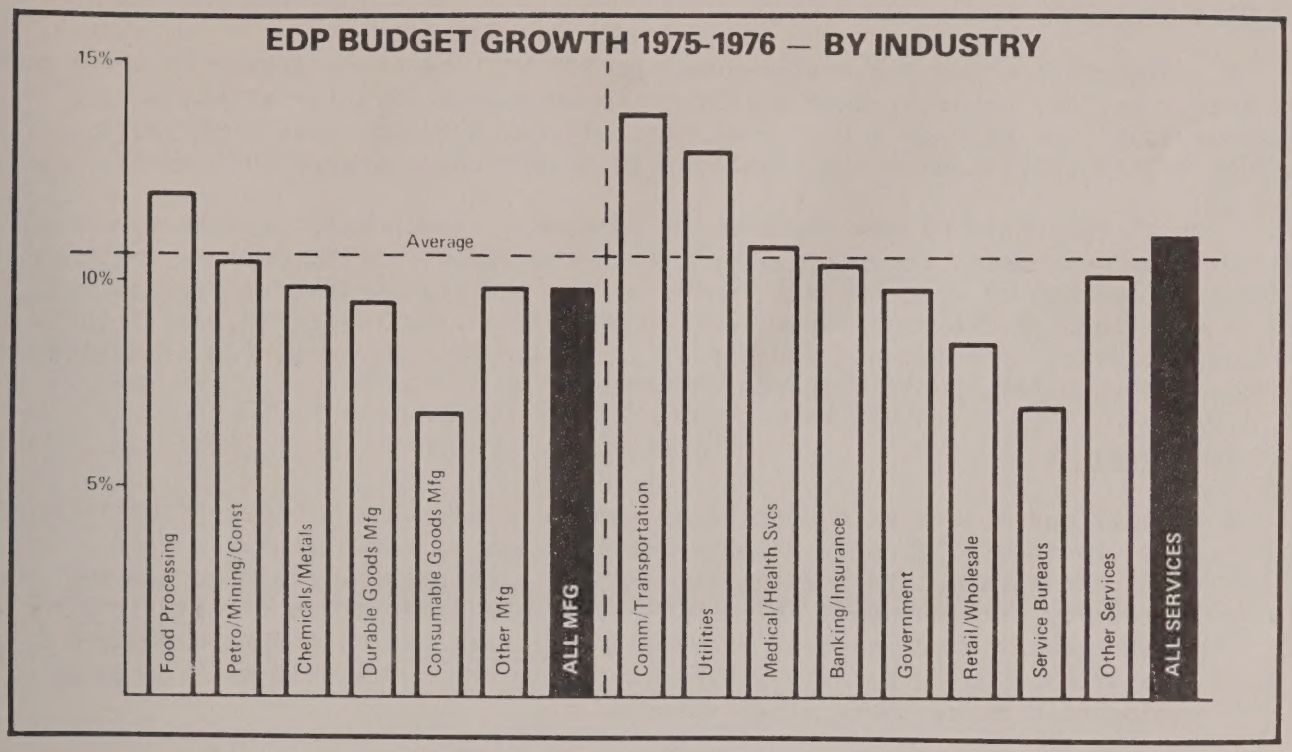

base -- and 65 medium-scale users -- representing 55% of the installed base and the "breadbasket" of the computer industry. Survey results are corroborated by spending data that surfaces in other IDC reports and user interviews.)

Keeping up with inflation

The spending growth across IDC's 128-company model over the last four years looks like this:

Increases in Spending (Real/Inflationary)	1973	1974	1975	1976
All Hardware	13%	9.5/2%	9/4%	8/3%
All Outside Suppliers	16	17/2	15/2.5	17/2
Salaries	6/5	8/6	2/8	5/8
Total	12/2	14/3	10/4.5	13/4

As might be expected, inflation rears its head the ugliest where technology has the smallest chance to mitigate the spiral -- i.e. in personnel costs. Here, 8% of the increase from 1975 to 1976 comes from salary hikes; only 5% will go toward real addition to EDP staff. A little less than half of the latter will be new jobs, the rest increased function. And also as might be expected, the salaries percentage of overall EDP budgets is dropping slowly over the years . . . as hadware and firmware slowly replace lower-skilled "peopleware."

But overall the inflationary spiral seems to be dampening a bit. Supplies costs are escalating less rapidly, for instance; hardware price increases will have about half the effect on users in 1976 than 1975, for another. Interestingly, in the purchase of general-purpose (Group A) computers the 1976 price hikes -- call it inflation -- will just offset a slight erosion in shipments ($1.9 billion in 1976, $1.9 billion the year before).

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Spending patterns

The pie chart on page 2 breaks down the $30 billion users expect to spend on EDP this year, not counting that at first time sites (a volatile market sector these days!). For reference sake, IDC clocked user spending just four years ago in 1972 at $15.6 billion -- little better than half the expected 1976 outlay.

While the ratio of the three major sectors -- equipment, outside spending, and salaries -- remains roughly 1:1:1, within the wedges of the pie the fortunes of various sectors of the computer industry rise and fall. Besides the general trends mentioned in the preliminary survey reported earlier (EDP/IR,Dec.31,1975) -- heavy activity in terminals and disks, increased CPU upgrades, PCM stability -- there are some other specific trends to notice:

In hardware:

- Rentals and leases of systems from manufacturers shows a most significant growth of 15%, only 3% of which IDC tags as inflationary. This contrasts with a 1974-5 change of only 7% real growth. This growth -- highest in this category in years -- reflects an increase of additions to the rental base compared to simple replacements. It's another sign of systems topping out in workload capacity and bodes well for the used equipment market, among other things.

- Information appliances -- or autotransaction gear such as POS terminals, autotellers, stock quotation terminals, etc. -- are a definite "hot button" category. Spending here should double from 1975 to 1976 and probably crack the $1 billion mark in 1977.

- Minicomputer spending including maintenance and purchase in the U.S. will be up 39% -- a rebound from last year's placid (?) 27% growth.

- Third-party leasing, growing at a relatively sedate 7%, will nonetheless pass the $1 billion milestone this year.

USER SPENDING BY MAJOR CATEGORIES ($ MILLIONS)

	1973	% /	1974	% /	1975	% /	1976
EDP Systems	6,434	9/2	7,171	9/4	8,100	8/3	9,000
Other Hdwe	1,114	43	1,598	28	2,040	44	2,930
Datacomm	1,221	28	1,568	29	2,020	26	2,545
Software (Outside)	239	47	352	29	455	33	605
Services (all)	2,240	20	2,685	16	3,115	20	3,740
Supplies	826	10/10	991	8/6	1,130	4/5	1,230
Total Non-Salary	12,074	17/2	14,365	15/2	16,860	17/2	20,050

("/" indicates "real" growth/price increase; "Other Hdwe" includes minis, data entry gear and information appliances; "Services" includes non-computer users.)

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In outside spending

- Datacomm equipment (multiplexors, modems, etc.) and communications line costs will continue their heady growth to $2.5 billion, up 26% from last year's $2 billion. Line costs are growing about half as fast as spending on datacomm hardware (terminals not included).

- Software spending and remote computer services spending (including that by companies without a computer) will both jump 33%. Spending on remote services will come to within $100 million of that for traditional batch work . . . and undoubtedly surpass it in 1977.

- Supplies spending growth will drop back under 10% -- primarily as a result of cost containment practices initiated during the years 1974 and 1975. Real growth will tally only 4%.

User liberation

Besides mechanically counting the dollars and cents of user spending, IDC also probed user attitudes . . . and found them much molded by environment, and, to some extent, drifting from hardline IBM doctrine. Life is going on-line -- even at medium-scale sites now -- and users are getting more sophisticated.

This sophistication -- and, of course, the recession's clench on budgets -- is having its effect. Interest has been sparked at medium-scale sites in superminis vs mainframes, and in the Amdahl 470 at larger sites. The purchase of outside software is becoming more acceptable; structured programming and top-down project management is striking the in-house work force. And alternatives like distributed processing -- defined in about as many ways as there are users -- are being examined every whichaway. (IDC found, for instance, that 71% of the large companies in the survey were "very interested" and would be "getting into" it someday . . . whatever it was.)

On the other hand, while teleprocessing and data base applications are a major driving force behind user spending growth, IDC found users cool to alternative transmission services such as Datran or Telenet ("watchful waiting") . . . and not

U.S. - COMPUTER SYSTEMS HARDWARE ($ MILLIONS)

	1973	% /	1974	% /	1975	% /	1976
System Rentals	3,550	8/2	3,905	7/4	4,335	12/3	5,000
Indep. Per. Mnfr. rentals	203	35	275	29	355	20	425
Third-Party Lease Spending	792	10	870	7	935	7	1,000
Purchases: Gp A Gen. Purp. Sys.	1,494	8/2	1,643	10/6	1,900	(4)/4	1,900
Maintenace: Gp A	395	13/8	478	12/8	575	10/7	675
Total EDP Systems	6,434	9/2	7,171	9/4	8,100	8/3	9,000

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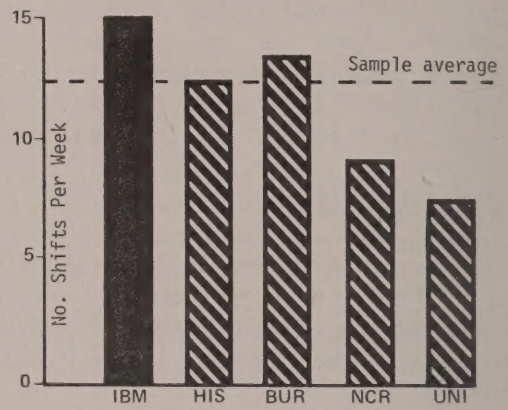
so eager to jump on IBM's System Network Architecture (SNA) bandwagon. Only 26% of the users interviewed by IDC planned to adopt SNA during 1976/1977, and about half had no plans to adopt it at all. IBM's data base software (IMS), however, was found to be almost a de facto standard by now ("not so good, maybe, but too important not to be IBM").

Users, in other words, are a cautious, cost-conscious, but increasingly savvy and questioning lot . . . and at least as worried about the hidden problems of new ways of doing things as resistant to vendor pressures to innovate.

Spending and vending

The snapshot is this: with last year's deferred applications going on-line now -- 56% of the users surveyed will be implementing major new applications this year, primarily of the interactive variety (teleprocessing related expenditures should show a continuous growth over the next several years of about 25%) -- growth prospects in the computer industry are bright.

Beyond that, as the economy continues to improve and the industrial sector revives, spending in later years should also induce new applications development.



COMPUTER UTILIZATION
(Medium-Scale, Single CPU Users)

And the upshot of all this new applications implementation is a net new hardware demand on an equipment base that has very little excess capacity . . . heartening news for EDP vendors, not the least of which is IBM.

For 1976, IDC sees the following growth prospects:

- Excellent (15% to 50% growth): Mainframe manufacturers, minicomputer manufacturers; COM, paperless alternatives; Data base software suppliers; Services; Independent suppliers of disks, teleprocessing gear.

- Good (10% to 15% growth): Third-party maintenance; Independent main memory; Third-party lessors.

- Adequate (up to 10% growth): Key-to-disk manufacturers; Independent communications networks; Independent peripheral vendors of tapes and printers; Disk pack manufacturers.

Bolstering the outlook from the vendor's point of view is overseas spending. While the IDC survey deals only with U.S. companies buying U.S. goods, the international market was considered even more dynamic last year than the domestic market -- and should be so again this year.

In fact, the ability of overseas markets to absorb new EDP equipment will actually exceed that of U.S. markets within two years . . . when the international "net add" of computer shipments (U.S. mainframers only) will pass the U.S. "net add." Companies with substantial hunks of overseas revenue -- like IBM, which now accrues half its revenues from overseas operations -- will benefit from this development. Overseas users, though, will spend their money slightly differently from U.S. users . . . as befits a younger, less sophisticated user base.

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PLANTING THE SEED: ANOTHER KIND OF SPENDING

Few deny that this organism we know as the computer industry -- which U.S. users will feed $30 billion this year -- found its first nutrient in military and government dollars. The Russians launched more than a satellite with Sputnick . . . they also launched a decade of unprecedented government spending on scientific research of all types. The computer industry got its share.

And though times are tighter these days, that government teat is still not bone dry. Last month at a special White House briefing of some senior AFIPS officials, the government outlined its research spending plans for the next fiscal year (FY 77). Addressing the group were spokesmen for the two largest funding organizations of computer R&D in the Federal Government: The National Science Foundation, with a proposed FY 77 budget of $15.8 million, and the Defense Advanced Research Projects Agency (ARPA), with a proposed FY 77 budget of $37.7 million. The spending breakdown for the two agencies looks like this:

NSF

Program Title	Actual FY 75		Estimated FY 76		Estimated FY 77
Theoretical Comp. Science	$2.13M		$2.35M		$2.65M
Software; Programming Sys.	2.68		2.75		3.15
Computer Sys. Design	1.69		1.84		2.00
Networking for Science	0.63		0.80		0.80
Techniques and Systems	2.35		2.10		2.10
Software Quality Research	0.94		1.30		2.50
Special Projects	1.36		1.40		2.60
Section Total	11.78	(6%)	12.54	(26%)	15.80

(Overall, noted the NSF, R&D has declined about 30% [in 1967 dollars] from 1967 to 1975, but research alone has remained about constant. In "real" dollars the increase in funding from 1975 to 1976 is on the order of 15%.)

ARPA

Basic Research:	
Image Understanding (using symbolic processing techniques)	$3.0M
Intelligent Systems (artificial intelligence)	8.4
Advanced Memory Technology (10^{15} to 10^{21} bits)	4.8
	17.2
Distributed Information Systems:	
Software Technology (emphasizing expense, reliability)	5.0
Speech Processing (continuous and packet speech)	4.1
Network and System Security (primarily military)	1.1
	11.0
Integrated Command and Control and Communications:	
Packet Radio (radio-linked miniprocessors)	9.5
Internetting Studies (interfaces, protocols)	=====
	37.7

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• PHASE TWO OF WANG LABS' STUDIED ASSAULT ON NEW MARKETS CAME THIS WEEK with the announcement of new additions to the WCS-10/20/30 family of small computers announced last April (EDP/IR,April 30,1976). The new additions include a small, portable computer designed to compete head-on with the IBM 5100, a disk-based work station for clustered system use, several homegrown mechanical peripherals, and some end-user software products.

The "2200 PCS" portable computer, costing $5400, is a 55 pound mini-based desktop system that plugs into any wall socket and comes with 8K bytes of semiconductor memory and 42.5K bytes of Read Only Memory. PCS also comes with a 9" CRT, tape cassete, and is expandable to 32K ($9800). It's progammable in Wang's extended BASIC -- for which Wang has a library of over 200 programs -- and can attach to a gamut of Wang peripherals. PCS will be marketed to the same people that now use NCR, Nixdorf and Olivetti bookkeeping machines, to users with such programmable calculators as Textronix' 4051 and HP's 9825, and to users of minis like the DEC PDP-8.

At the same time, users wishing to build multiprocessing, clsutered systems for distributed use will now find a $4900 Wang disk work station available for the job . . . which Wang says will compete with the System/32 as well as Datapoint and Sycor intelligent terminals. Each work station contains a Wang 2200 mini, 8K memory and CRT/keyboard, and a 5 or 10 MB disk. Each can process up to four jobs at once; three additional work stations can be multiplexed to one system in addition to the 2200 CPU itself.

The other products announced by Wang -- a 120 CPS printer ($2900), an Intel-8080-based drum plotter ($2900), communications controllers for 3780 emulation, a Managment Planning System software package, and WANG/CASH turnkey accounting system -- are a further sign of the company's emergence from the lab into the small business/distributed processing market. Wang claims extensive end-user expertise from its 2200 and word processor base . . . and last year shipped 1700 of its WCS systems, worth about $40 million.

• THE MEDIA IS THE MESSAGE, SAY CDC AND ICL, who have signed an agreement to market the stuff in the U.K. under a joint company to be called Control Dataset Limited. Under the plan, CDC's U.K. business products operations and ICL's subsidiary, Dataset, will merge -- a pooling of about $5 million in assets. Everything from disk packs and tapes to business forms and furniture will be manufactured and marketed. CDC will own 75% of the venture.

• MEDIATE'S THE MESSAGE, SAY CDC AND AMERICAN EXPRESS, who have announced the settlement of legal disputes over the handling of computer-operated ticketing for the American Film Theater in 1973 and 1974 by Ticketron, a CDC subsidiary. No blame was assessed and the terms of the settlement were not disclosed.

• HAVE A BALL WITH OUR NEW 50-MEGABYTE DISK DRIVE, says Ball Computer Products, which will introduce a high-density, 3330-type, 50MB disk storage drive for minis and small computers in April. A standalone 3330-compatible formatter for the new disk and other 3330-type drives will come out later this year. Ball claims its disk, priced to compete with older disks now avialable, is especially reliable.

• BUT WILL IT READ A DOCTOR'S PRESCRIPTION? Information International, Inc., says its computer-controlled GRAFIX 1 can read intermingled machine and human hand printing. It operates at 150 cps with a reject rate less than 2% and substitution rate under .05%. First application: Britain's Dept. of Health and Social Security.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 21, 1976 • VOL.11,NO.17 P.J.McGOVERN,PUBLISHER

Legal review

THE IBM TRIAL MOVES OUT OF THE "MARKET DEFINITION" PHASE . . . AS IBM LEGAL FORCES RACK UP ANOTHER IMPRESSIVE YEAR

Thoughts for Consideration

The liability of IBM's risk lease is dependent on price leadership and price control.

By means of price leadership, IBM has established the value of data processing usage.

> IBM then maintains or controls that value by various means: timing of new technology insertion; functional pricing; coordinated management of delivery; support services and inventory; refusal to market surplus used equipment; refusal to discount for age or for quantity; strategic location of function in boxes; "solution selling" rather than hardware selling; refusal to support subsequent user hardware, etc.
>
> Unbundling has created a new threat to IBM's price control.
>
> -- from the "Faw Memorandum" of 1969 reprinted in EDP/IR on 12/29/72

Legal clocks, it seems, tick ever so much slower than others . . . and though the giant of giant antitrust cases finally went to trial last year -- and it's easy to underestimate the magnitude of that feat -- that's about all it did. Still, it's a high-water mark in the 7-year old case and a milestone in industry history . . . for the outcome of this trial may someday have a more profound effect on the industry than all the recessions, "future systems," LSI chips or whatnot between now and then. Meanwhile its uncertainty casts a shadow on us all.

So far it's still the government's show, and this month saw a significant mark of progress in the plaintiff's presentation . . . as the DOJ virtually wrapped up the "market definition" phase of the case and moved on into "monopolistic conduct." Conduct to be covered includes bundling, fighting machines, and educational discounts.

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And the DOJ lawyers might well breathe a sigh of relief that they're out of the definitional morass -- although "market definition" is a crucial part of any antitrust case, as Telex illustrates -- and into something as concrete as IBM's actions in the marketplace. For, although the DOJ called many high-powered industry executives to the stand . . . it's unclear to the lay observer, at least, if the government ever really made its point. Time after time witnesses listed their competitors as few, only to have IBM counter with documents from their own files that countered their market share testimony.

In addition, witnesses from GE, RCA and Xerox balked at laying the blame for their companies' exits from the mainframe industry on IBM. Instead they cited judgements, misjudgements, and choices of alternatives made deliberately . . . often paying backhand compliments to IBM management in the process.

Indeed, in the substantive matters of the case -- where progress is often as discernible as the movement of a glacier -- courtroom observers generally award IBM the first round on points. Part of the DOJ's problem is the mismatch in legal resources between IBM and the DOJ's antitrust division . . . but even then, the Government's case at times seemed to flounder in its own issues. And IBM's winning of a rare "writ of mandamus" from the Second Circuit Court of Appeals to vacate certain rulings of trial judge David N. Edelstein (EDP/IR,Nov.6,1975) was another nettlesome IBM coup.

But if the DOJ offense was mushy during that first phase, it's picked up a leaner, more threatening look since the subject changed to IBM's conduct. Writes IDC's reporter from the courtroom:

> But with the "no foundation" objections and the "privilege" arguments [concerning the use of IBM internal documents] the most serious obstacles raised by IBM, the Government moved ahead into "bundling" with an air of confidence it lacked during testimony by witnesses from RCA, GE and Xerox. The "conduct" portion of the case seems to be one of the stronger parts of the suit, and DOJ lawyers are clearly glad to have arrived at a point where they can make extensive use of internal documents.
>
> The use of documents in "bundling" and their projected extensive use in the "fighting machines" and "educational allowances" segments of the "conduct" phase increase the impression that the government's case against IBM is largely based on these internal communications. Without them, the vague, often half-hearted documents and lukewarm testimony of executives from other companies do not seem to make a very strong case. "It's hard to prove an antitrust case on paper," one observer remarked, but that seems to be what the government hopes to do.

The other side has noticed the change, too. Says IBM, the new phase marks "an important juncture in this lawsuit" . . . noting that the Government has now presented the first of the internal documents IBM considers privileged.

(These claims of privilege for reasons of "legal opinion" and "attorney-client" content apply to three documents generated by IBM executive Hillary A. Faw at the request of the corporation's counsel in 1969. Faw, whom IBM says was in the role of devil's advocate, talked about IBM's price control and the threat of unbundling -- as the first quarter or so of his memo "Thoughts for Consideration" on page 1 shows. Subsequent to IBM's objections -- which have already been up and back to the Supreme Court once -- Edelstein ruled the papers into evidence.)

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GRIM STATISTICS

On April 1, the Government's presentation moved into the "bundling" segment of the "monoplolistic conduct" portion of its case. Though a few odds and ends were left to resolve in the first phase, for all practical purposes the suit had finally reached step two. But consider this:

1) April 1 was the 111th day of trial
2) The trial started May 19
3) April 1 is 319 days after May 19
4) 27 witness have been called to the stand
5) According to current witness lists, 281 witness are left to appear (108 for the Government, 200 for IBM)

QED: The trial will last 3637 days. Ten years!

Admittedly this is "worst case" mathematics . . . but even if all those witnesses aren't called, or IBM's side of the case picks up, or the lawyers discontinue their objections, motions and so on . . . the trial will still last an outrageously long time. And when it's finally settled, what then? Will the industry be recognizable? Can a decision based on the data processing environment of the 1960s relate to life in the 1980s? In the meantime, how does the industry labor, to use CIA terms, under the cloud of litigation?

IBM's track record

Outside the Foley Square courtroom, 1975 saw the ebb and flow of private actions continue . . . as computer lawyers kept busy with settlements, appeals and pretrial discovery. And since the "big" battle got underway almost a year ago in New York, most of these other legal skirmishes seem to have gone -- or at least drifted -- IBM's way:

- Telex settled out of court. On the steps of the Supreme Court, writ in hand, the Tulsa peripherals maker chose not to bet the company on the possibility that the High Court wouldn't hear the case or would side with IBM if it did. IBM thus released Telex from an $18.5 million trade secrets judgement stemming from its countersuit . . . an $18.5 million that Telex admitted it couldn't pay. Though a sensible move on Telex' part, the settlement dampened hopes of other litigants looking for clues to High Court thinking on this IBM-antitrust matter.

- Marshall Industries settled out of court. Long out of the peripherals business its suit concerned, the firm accepted $800,000 to halt its action (it had asked $67.8 million!). But more important than the settlement per se was IBM's clear notice that it will pay -- some money, at least -- just to stay out of court. And as if to underscore that theme, the Giant last month handed defunct Memory Technology Corporation $50,000 to halt its suit -- filed just before the add-on memory maker closed its doors in late 1974.

- IBM skunked Symbolic Control, Inc., when a California judge dismissed the "inactive" company's suit . . . the evidence, he said, failed to show that Symbolic Control's failure to sell a single product resulted from an IBM monopoly. Though most industry observers had never heard of Symbolic Control -- or its suit -- until the dis- (Continued on page 6)

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SOME POINTS OF TESTIMONY

While the statements below aren't necessarily the points that Judge David N. Edelstein will consider in reaching a decision -- or even a comprehensive review of all that's been said in the witness box -- they do provide a cross section of one observer's impressions. They're interesting at least.

But a word of caution: While EDP/IR feels that the gist of what was said by individuals has been served, the statements below are heavily paraphrased versions of the actual testimony. They are not verbatim transcriptions.

\+ + + +

. . . Given the size of IBM's cash flow, its profits and installed base, IBM could effect drastic price changes, particularly during an inflationary period. It is conceivable [but not necessarily a good idea, even from IBM's point of view] that Honeywell could be driven out of the business.
-- Clarence Spangle, on Honeywell, 10/3/75

. . . Ditto. -- John J. Hangen, on NCR Corp., 10/16/75
-- Rigdon Currie, on Xerox, 3/31/76

. . . IBM dominates the industry . . . but also it's a "splendidly managed company."
-- Richard M. Bloch, on GE/HIS/Raytheon, 11/18/75

. . . RCA's own RCA Series "blew Spectra out of the water."
-- Edwin S. McCollister, on RCA, 12/18/75

. . . Our goal was to be number two in the industry, and we felt that 10% of the general-purpose systems market was necessary to achieve that.
-- Richard M. Bloch, on GE, 11/17/75
-- Arthur D. Beard, on RCA, 12/4/75

. . . Ditto (15%). -- Harvey Cohen, on Xerox, 3/15/76

. . . IBM is a major force in the industry -- one with which any manufacturer must contend -- but IBM did not specifically cause our leavetaking.
-- Reginald H. Jones, on GE, 12/9/75

. . . Ditto. -- Anthony Conrad, on RCA, 3/9/76

. . . It was felt at RCA that IBM had deliberately underpriced the 145 to undercut the RCA 6. Additionally, the use of semiconductor memory and a longer delivery schedule were seen as attempts to hurt RCA. RCA changed its mind about IBM intentions when a former IBMer came to work and removed that suspicion. But later RCA discounted his information as "not first-hand."
-- V. Orville Wright, on RCA, 2/26/76

. . . Each case is different and factors must be constantly juggled in coming to conclusions as to the structure of a particular market.
-- Frederick Scherer, on economics, 6/16/75

. . . "This is a courtroom dedicated to trivia."
-- John J. Hangen, on the trial, 1/15/76

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IBM AS OEM?

Last fall, in the course of pretrial discovery, Memorex found within the files of G.E. Jones, onetime member of IBM's Management Committee (MC), a 103-page document entitled "Corporate Marketing Analysis of Should IBM Be in the PCM or OEM Business." Despite its cumbersome title, the handwritten study, dated September 7, 1971, is a terse outline of the pros and cons of its subject.

When the document surfaced, its PCM portion stole the show because of its discussion of interface development -- the cost of which was a major deterrent to IBM entry. (Telex, remember, was marshalling its do-or-die arguments for the High Court about then). Little was said of IBM as an OEM . . . an intriguing thought in itself. So here are some of the Giant's own fragmented words on the matter -- out of order and context to be sure -- but still fun to ponder:

\+ + + +

-- Task Force reported [in a previous report] the following primary reasons for IBM's entry: [one is] Defensive strategy in anticipation of PCM marketing -- IBM should compete with PCM in OEM market as well as end user . . . .

-- MC accepted [the previous] report in principle, wanted to review specific business cases before final decision to proceed . . . .

-- For new technologies fixed cost ratio [5x manufacturing cost] would be a very effective way to maximine IBM's competitiveness. Added care is needed to ensure price level protection against PCM purchasing [an] IBM OEM product at the low level price and engineering it for resale to the IBM end user . . . .

-- IBM OEM products will be: 1) completed end unit boxes at normal sales manual purchase prices, 2) sub-assembley second level products at special "OEM Sales Manual" prices . . . OEM pricing protects from competitive PCM buying IBM OEM product -- finish package to end box -- then selling as a PCM unit . . . OEM 2nd level products are not shipped until after FCS of completed end unit box to IBM end user customer. Interface data is not available until FCS . . . .

-- The effect of IBM OEM business . . . makes competitor's system better -- true but -- if IBM doesn't supply the peripherals the PCM will -- the "market vacuum" gets filled . . . .

-- The market has changed -- IBM no longer has a product unique situation with "an IBM 2314 exclusive competing against a Univac Fastran drum" -- further it should no longer expect an exclusive in the future -- just a lead . . . .

-- The effect of IBM OEM business . . . opens [the] door for competitive PCM 370 CPU using IBM OEM peripherals. But -- this is a natural technological advancement that will likely occur with or without an IBM OEM business . . . .

-- CONCLUSIONS: 1) There is a business opportunity for IBM as an OEM vendor, 2) This study has found no compelling business reasons remaining for IBM not to enter this market (Question of enhancing competitive systems has changed with the introduction of "IBM equivalent" peripherals on competitive systems, e.g. "3330 disk" on Burroughs -- "3420 tape" on RCA), 3) IBM OEM marketing of coming advanced technology products would still provide a defensive marketing strategy -- allowing IBM competition with PCMs in the OEM market as well as the end user market . . . .

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missal announcement, the judge's action was construed as a psychological boost, at least, for the IBM legal squad.

- IBM won an unlooked-for concession from the militant Computer Industry Association -- which last month issued a call for "peaceful settlement" of the antitrust war. The CIA proposal, however -- which asked IBM to invest $2 billion in an industry-wide leasing unit and give up its Domsat ambitions, among other things -- fell on unsympathetic ears.

For the anti-IBM forces, then, 1975 appears to have been a holding year at best . . . a legal recession (Telex defused, the DOJ on the ropes) at worst. But there is still much to come.

The West Coast cases

For plaintiffs left with private suits against IBM, 1975 was a quiet year of bricklaying . . . of amassing legal momentum for trials to begin this year or the next. Most of the firms have been taking part in consolidated discovery proceedings on the West Coast . . . and except for the Marshall pact and the unearthing of one spicy IBM memo (see page 5), little of outward excitement occurred.

The rundown:

- Hudson General and Transamerica -- often called the "Telex Tagalong" cases because their claims are based on ownership of Telex gear -- were once set for trial this August. But that was last fall. Since then that date has been vacated and no new one set.

- Calcomp's trial date has been set for November 1976; Memorex and Forro are scheduled to start in March, 1977. These are the biggest of the private suits . . . also the least dependent on Telex precedent and probably the least likely to settle out of court.

- Sander's suit has been "unconsolidated" back to New Hampshire and no new trial date has been set. Suits by Levin and DPF are also still pending against IBM, but with no trial dates set.

Besides the startup of some of these suits, another private antitrust event could take place this year: the appellate ruling on the Greyhound case. That company's suit against IBM was dismissed four years ago (even before IBM presented its side). It was argued before the appellate court two years ago.

Indeed, if anything, 1975 in review shows how slowly the legal mills grind on . . . but do they, one wonders, also grind exceedingly fine?

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CENTRONIX DEBUTS ITS NEW 700 SERIES MATRIX PRINTERS
60 CPS UNITS HINT AT A NEW MARKET THRUST, CHANGING COMPETITION

Long the mogul of matrix printers, Centronix this week introduced the first of a new family of devices -- hinting in the process that the company's aging product line may be in for an evolutionary overhaul. While the new printers operate at slower speeds than any current Centronix model, company President Bob Howard indicated that new models will follow that may indeed replace some of the 101-based printers that have been the heart of the company's product line since 1971.

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The new printers, which will be shown publicly at the Hannover Fair in Germany this month and at NCC in the U.S. in June, are innovative primarily because of their modular design, low cost, and higher performance, says Centronix. The four models shown this week are:

- The 700 -- a 60 cps unidirectional serial printer with an effective throughput of 13 to 90 lines per minute. The standard unit prints 80 columns at 10 characters/inch. The end-user price for a 700 is $1520; the quantity price (100) is $885.

- The 701 -- a bidirectional version of the 700 which prints at 60 cps. Centronix claims a throughput of 25 to 120 lines per minute. The end user price for a 701 is $1815, quantity (100) price $1070.

- The 761 -- a bidirectional teleprinter offered in either "Read-Only" or "Keyboard Send/Receive." Both models print at 300 baud on-line. The end-user prices for the RO and KSR models are $1895 and $2025 respectively; quantity (100) prices are $1180 and $1275.

The printers each consist of three basic modules: 1) print module, 2) forms handling module and 3) electronics module . . . and this modularity, says Centronix, will allow OEMs to mix and match features according to their needs. This, in turn, says Howard, will allow Centronix to take better advantage of what he calls the "OEM Open Window" . . . that short span every several years in an OEM's own product cycle when new printer technology can be worked in.

The marketplace

Until recently, however, Centronix has had little to fear from those open OEM windows -- for the company dominates the impact printer market. In fact, it virtually created it (IBM helped with its System/3-6 printer installed in 1970). By filling the gap between Teletype/typewriter printers and the higher speed line printers at just the right time, Centronix managed to build an empire that has sent over 60,000 units to some 400 OEM customers . . . and boosted company revenues from $564,000 in 1971 (FY) to $6.9 million in 1972 to $41.6 million in 1974.

But since then IBM has incorporated matrix printers in a growing number of products (including the System/32 and the 5100), and consequently stimulated the manufacturing of IBM replacement systems. Until recently, Centronix -- with units from 88 cps to 200 lpm -- was practically the only alternative available for IBM competitors. Now the market is big enough and volatile enough to attract attention . . . and threaten Centronix from two directions:

+ Centronix customers like DEC and Wang, tired of tithing to their printer supplier, are getting into the business themselves. Others could follow suit as their own business needs dictate.

+ Firms in adjacent marketplaces, like Teletype, GE, Extel and others, stand ready to encroach on Centronix territory. (GE is already there with the 120 cps Terminet 1200.)

So Centronix must work harder -- updating and innovating -- just to maintain its share of the matrix printer pie . . . which IDC estimates may grow to as many as 415,000 units worth $1 billion by 1980. And that represents a 30% average annual growth rate, which Centronix -- and others -- would love to latch on to.

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• IBM BEGAN THE MONTH IN COMMUNICATIONS, namely with enhancements to the 3600 finance communication system and the 3790 communication system. For the bankers IBM announced two new teller terminals with keyboard and printer which take up 40% less space than previous models and come with a keyboard pad with which customers can input ID numbers. The purchase prices for the keyboard display terminals are $1575 and $1825 ($60 and $69 under ATP); for the document printer it's $2225 ($90 under ATP). In addition to the terminals and printer, new controllers for the 3600 were also announced -- while purchase prices on old controllers were reduced. The new controllers have monthly rental charges that run from $500 to over $1100, depending on the model chosen, disk size, diskette type, etc.

Interestingly, IBM chose the new 3601 controllers to debut a new diskette with twice the capacity of anything previously available from the company. While the development was anticipated, many expected it would be a double density diskette -- instead it's a disk that can record on both sides. Old media can be used with the new drives, but the new media can't be used in single-side drives.

The 3790 enhancements consist of software changes that give "users the ability to communicate interactively with a host computer's data base while processing work at remote locations." Included were an extension of IBM's CICS/VS and IMS/VS to allow 3790 inquiry and file update, 3790 remote job entry control, and, significantly, 3790 support under TCAM. Previously, the 3790 was only supported under VTAM.

• SHUNNING THE OLD KEY-TO-DISK LABEL, Entrex has announced a new family of "remote processors" dubbed the 600 series. Designed for source data processing, the mini-based systems include micro-based terminals, disk and/or floppy disk storage, and appropriate output devices. As it stands now there are three models in the family, running from 32 KB to 64 KB in main memory, 630 KB to over 264 MB in auxiliary storage, and $677 to $3148 in monthly rental. The systems come with optional peripherals and emulation capabilities -- including IBM 3270 emulation -- and a data entry package compatible with the Entrex 480. A COBOL-like high-level language is standard. Indeed, the 600 series is more than good old key-to-disk.

• AND GETTING INTO DISTRIBUTED PROCESSING FROM ANOTHER DIRECTION, Harris Corp. has announced a new disk-based operating system called ECOS for use with its 1600 Remote Communications Processor family. With it users can "operate in a multi-job, multi-task environment performing functions such as data entry, remote-batch, file manipulation, media conversion and local batch processing concurrently on the 1600 system." Also announced with ECOS were other software products and a new CRT workstation. ECOS will be available this quarter.

• LASER MASS MEMORY WILL SEE FIRST COMMERCIAL LIGHT THIS SUMMER, say executives for Optimum Systems (customer) and Precision Instruments (supplier). OSI is purchasing three of PI's System 190s (EDP/IR,May 30,1974) for use in its California and Washington, D.C., data centers. The intial systems, which will cost a total of $1.25 million, will each contain 16 million bytes of on-line memory. The 190s can be expanded, however, to over 128 million bytes.

• GE PLANS A $17 MILLION TREAT FOR THE DUTCH: a third remote computing "supercenter" to be located near Amsterdam. Two other "supercenters," which anchor GE's Mark III service, are located in the United States. The Amsterdam center will provide service not only to the European continent . . . but also to the U.K., the U.S., Australia, and Japan.

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REVIEW & FORECAST

EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 30, 1976 • VOL.11,NO.18&19 P.J.McGOVERN, PUB.

Reaching for the '80s

AFTER A LEVEL 1975, SEVERAL YEARS OF SHIPMENT INCREASES FORECAST

As the computer industry emerges only slightly bruised from the recent recession, the backbone of strong fundamental demand for data processing products and services becomes more apparent by the day. As a result, EDP/IR predicts a rapid bounceback . . . and recovery at a higher rate than previously anticipated.

U.S. shipments of general-purpose mainframes in the years ahead will be lower than forecast last year. But they will also be less cyclical. This is largely because IBM is now expected to continue the staged introduction of nonrevolutionary new equipment -- souped-up 370s, enhanced software, etc. The result: Lower system retirements and a higher-than-normal percentage of user purchases.

Internationally, 1975 shipments of general-purpose computers were better than expected, and the five-year outlook is good. After a second year of 10% growth in 1976, shipments should increase some 14%-to-15% annually for the rest of the 1970s.

For minicomputer vendors -- set back to "only" 30% growth in revenues for 1975 -- this year looks bright, with revenues jumping 40% to the $2.2 billion level. Growth will continue as the decade stretches toward 1980 . . . when revenues will top $5 billion. For suppliers of computer services, the future also looks bright. Revenue growth (to $3 billion in 1975) slipped below 20% last year, but will rebound to normal levels . . . producing 1980 revenues just shy of $8 billion.

Three important trends, smoldering during the recession, are expected to burst forth and fuel much of the growth. They sum up the state of computing, 1976:

- Data base applications . . . starting with the leading-edge users and spreading downward, the use of large, computerized data bases continues.
- Distributed processing . . . almost a corollary to the above, decentralized DP remains a long-term thrust of users and those who supply them.
- Small business computing . . . as costs drop, new strata of users are brought to market, with service companies competing for the dollars.

Merchants of the solutions these trends demand may have to compete harder, but there will be plenty of demand for their products and services.

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The participants

Despite the exit of Xerox and Singer -- and the eternal cloud of legal uncertainty, reviewed in the last EDP Industry Report (4/21/76) -- the mainframe industry as a whole did well in 1975. And first quarter returns for 1976 look better.

Total computer shipments topped $11.5 billion in 1975 and should hit almost $13 billion this year. Significantly, much of this growth represents real addition to the equipment base -- as "net add" (ship minus retire) in 1976 reaches its highest percentage of shipments since before the 360 to 370 conversions. As a result, by 1980 almost $125 billion worth of computers will be installed worldwide.

And the major suppliers of those systems will be the mainframers. With the user-oriented demand trends in mind we look at them:

IBM, the leader when users and marketing come to mind, will set the pace. Last year the Giant's rental base leveled as users continued heavy outright purchases, partly as a result of purchase-to-lease price adjustments by IBM and partly out of conviction that the 370 is still a safe investment. IBM computers are heavily utilized -- two shifts a day average -- and a new line of upgrades/replacements compatible with current user software would be well received. Along those lines, IBM announced the 370/168 "Attached Processor System" -- a hardware-only extension of the 168 that links the top of IBM's uniprocessor line with the bottom of its multiprocessors. Other 370 additions or replacements are likely this year. Meanwhile the Giant continues its commitment to data base processing, telecommunications, and distributed computing with upgrades to the 3791, 3705, and MVS software, new disk systems, renewed autotransaction vigor, Satellite Business Systems . . . and the steady infusion of System/32s into new computer markets.

Honeywell, on a base of steadily increasing shipments of Series 60s, managed to maintain profit margins and decrease debt to capitalization while making news on three fronts: 1) In Europe, HIS consummated its merger with CII and in one fell swoop increased its market share a point or two. 2) Despite (or because of) headaches from the GE buy-up in 1970, the company adopted Xerox's abandoned mainframe business. 3) With a decent product and apparent corporate commitment, HIS reentered the ranks of serious mini vendors with its new Level 6. If the company can handle its now sprawling product line and weld its controls/computers split personality together . . . then a foothold in the dynamic European market and the hardware wherewithal -- minis and mainframes -- to really address distributed processing may pace the company well for the computer systems race into the 1980s.

Sperry Univac, with the exception of the introduction of a new multiprocessor aimed at medium-scale users (the 1100/10), kept a low profile in 1975. But Sperry users aren't a particularly volatile bunch -- a smaller portion of its base historically churns yearly than all other mainframers -- and their increasing loyalty to Sperry systems and peripherals bodes well for the company. Perhaps the biggest question . . . when and if will Sperry offer a small business system, a sub-90/30 computer to compete with the S/32 and others? Its recent unveiling (page 16) of a major new line of distributed processing terminals may hold some answers.

Burroughs, perhaps the most profitable mainframer next to IBM, surged ahead this week with the announcement of a new small system, the B 80. Prior to that the firm had unveiled the first of its "800" series -- its vehicle to the 1980s. With its loyal band of computer users, large accounting machine base, and technological leadership, Burroughs is one of the less troubled IBM competitors.

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STATUS OF WORLDWIDE COMPUTER MARKET FOR U.S.-BASED MANUFACTURERS
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	1975 Shipments:		In Use Yearend 1975:		
	$M	% Total	$B	% Total	1974-75 Change
IBM	6,650	57.6%	36.2	58.3%	+ 13.1%
Plug-Compat.	500	4.3	2.5	4.0	+ 13.6%
IBM Systems	7,150	61.9	38.7	62.3	+ 13.2%
HIS	820	7.1%	5.8	9.3%	+ 9.4%
Burroughs	710	6.2	3.2	5.2	+ 14.3%
Sperry U.	630	5.5	4.3	6.9	+ 10.3%
DEC	600	5.2	2.0	3.2	+ 53.8%
NCR	300	2.6	1.6	2.6	+ 14.3%
CDC	295	2.6	2.4	3.9	+ 9.1%
Others (incl. minis)	1,035	8.9%	4.1	6.6%	+ 36.7%
TOTAL	$11,540	100.0%	$ 62.1B	100.0%	+ 14.8%

Note: EDP/IR is engaged in a major project to re-evaluate the average values, categorization, and distribution of computers installed by U.S. manufacturers. Results will be published upon completion. At present, it appears the most significant difference is with Sperry Univac's installed value, which will probably be increased by some $500 million.

NCR, currently the autotransaction Giant, just this week reaffirmed its commitment to the mainframe business with the introduction of the first of a new family of technologically advanced yet Century-compatible computers called the "Criterion" series. But the company has had rough sledding phasing out of its mechanical era into electronics -- last year's and this quarter's earnings show it. Still, the company has a large base of accounting machine/small computer users, a clear market edge in autotransaction systems, and a determination to stay in the game . . . perhaps in concert with CDC in a future jointly developed computer family.

CDC, the heavyweight in mainframes, seems to have chosen the migratory way out -- concentrating on services, joint projects, and specialized application for its number crunchers. Its big Cyber 170s began shipment this year . . . and its profit picture brightened (1975 was one of only two profitable years in the last six). But as the services sector of the business grows -- and it's growing faster than the mainframe industry-- and CDC's systems revenue drops as a percentage of its overall take, that bleak fiscal history may change. Certainly CDC's push in peripherals, minis, and, some say, eventually in plug-compatible CPUs, will help.

. . . and others

As CDC's blending of solutions and systems illustrates, filling the users' needs entails more than shipping systems. Last year, for instance, just the six mainframers mentioned above tallied computer-related revenues over $18 billion. Add to that the revenues from third-party leasing firms, computer services, and minicomputer makers and the sum easily totals more than twice IBM's $11.5 billion computer-related revenues . . . a fact not likely to be lost on IBM's legal team.

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GETTING READY FOR THE BICENTENNIAL : NEW PRODUCT FIREWORKS

It's almost as if they wanted to clear out the back lot -- like auto dealers before the new models come in -- by infusing the mostly-old with a little new and thereby stretching the product line and development dollars. Indeed, it's been a heady trimester for new -- and, in some cases, anomalous -- products from the mainframers (NCR and Burroughs come to mind especially). Alphabetically:

Burroughs announced (4/30) the 32-81 KB B 730, featuring display-based data entry. Two weeks later (4/12) the company added four models to the top of the 7700 line by adding: 1) a new high-speed memory system with the same logic circuitry as the new B 800s, 2) a new I/O module, and 3) a new datacomm subsystem with larger memory, higher-speed data links and autonomous function. The new 7700s also function with the high-speed peripherals announced with the 800s.

CDC announced (3/30) the Cyber 18 family of mini-based systems and terminals geared for the distributed DP market. From $40K for a remote terminal to $115K for a dual-CPU timesharing system with up to 32 terminals, the minis come with microprogrammed MOS memory of 8-524 KB. (One model is based on CDC's System 17.)

DEC, counterbalancing the DEC 2040 announcement in January, announced (3/23) a new line-topper, the 1088. A basic system has two KL10 CPUs, 256K of 36-bit/word memory, a new dual-spindle disk (86 MB/spindle), some high-speed I/O, and a 32-line communications system. While announcing the $1.25M system, DEC also announced software designed to up the batch prowess of its timesharing family.

Lowering the entry fee to the Century club, NCR announced (4/7) the 16-64 KB Century 75, for batch or on-line use, available with a 19.6 MB disk and various communications capabilities ($1680/month or $60K to buy). Concurrently, NCR reduced purchase prices on the Century 101 by 14% and on the Century 151 by 19%.

And from a user's point of view -- at least as distributed processing, data base applications, and smaller and smaller standalone systems appear over time -- such comparisons are not necessarily hypothetical any more. Each sector has its strength -- whether it's in hardware, software, applications knowledge, industry expertise, or financing.

Services companies -- of which CDC is the biggest, with only 7% of the market -- will post revenues this year of $3.1 billion. And in the process of acceding to the trends mentioned, more and more will offer remote access services, transaction processing, etc. In fact, this year for the first time less than half the services revenues will be from straight batch processing.

Instead, timesharing, on-line transaction processing, remote-batch processing and on-line data base inquiry services will take the bulk of the users' dollars. Concurrent with putting users on-line, many bureaus will also be placing hardware -- terminals, intelligent terminals, and even standalone minis -- at user sites.

This offering of hardware by services suppliers could lead to specialized new products. In addition, supermarkets, other retailers, and banks -- whether joyously or grudgingly -- are leading the way for large shipments of information appliances. Other industries are sure to follow. For instance, note:

- While the number of general-purpose terminals in use will increase from 600,000 this year to 1,500,000 by 1980 . . . special-purpose terminals

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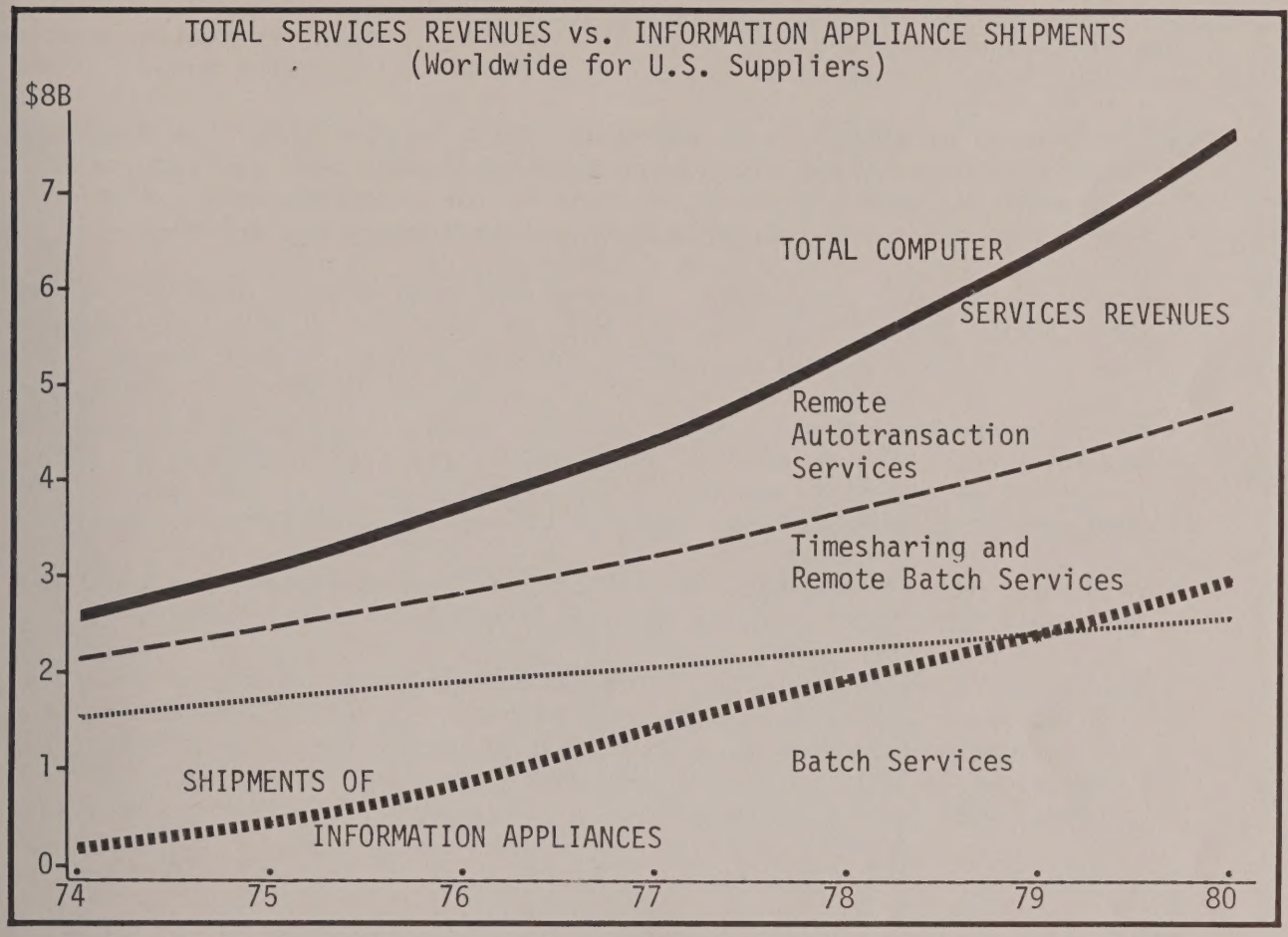

will grow even faster. POS registers, banking terminals, factory data collection devices, and the like will number over 2.3 million in 1980.

- Together, general-purpose and special-purpose terminals will represent a user investment of $25 billion by then -- almost $20 billion of which will be shipped in the next five years.

The comparison of services revenue and information appliance shipments is shown above. As the numbers show -- and as do the other numbers in this issue -- users gearing for the 1980s will have before them a glittering array of products and services to choose from, some complementing one another, some competing.

MINICOMPUTER REVENUES DIP, THEN REBOUND -- INDUSTRY STRETCHES TOWARD $2 BILLION AS IMPROVED ECONOMY, REVITALIZED OEM SECTOR, TECHNOLOGICAL MOMENTUM ALL ADD UP

As the recovery progessed during 1975, the mini industry set itself aright. A growth rate that had dropped in half one year (62% in 1974, 27% in 1975) promises now to regain almost half that distance. So 1975, with mini revenues hitting $1.4 billion was good . . . 1976, targeted for $1.9 billion, will be even better.

Spurring the rebound -- besides the industry's natural resiliency and technological momentum -- was the original equipment manufacturer (OEM) market. Although last year this sector accounted for only 40% of the value of minis shipped to U.S. destinations . . . still it gobbled up two thirds the units produced. It's a bedrock market, but one that's sensitive to inventory levels, money costs, and customer product cycles . . . in other words, the economy.

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But if 1976 estimated growth rates and earnings health are wearing a nostalgic early-70s look, the industry itself is nevertheless changing shape:

- The line-up of suppliers is evolving. With heavyweights like Honeywell Texas Instruments, and CDC applying renewed commitment and corporate muscle to the market (see pages 2 and 4, for example), market shares could be in for some substantial revisions between now and 1980.

- Product lines are stretching. At the same time PDP-11/70-type "superminis" were hitting the streets last year, vendors were expanding downward with products like the DEC LSI-11, TI 990, and DG "Micronova."

- Minis are getting more sophisticated. Vendors continue to add software and support. As a result, by 1980 service revenues will account for fully 20% of all mini revenues -- up from 13% in 1974. The average end-user unit will cost $45K by then; an OEM unit only a fifth of that.

- Applications are changing. By 1980, small business computers will use over half the minis shipped; today they use only about a third.

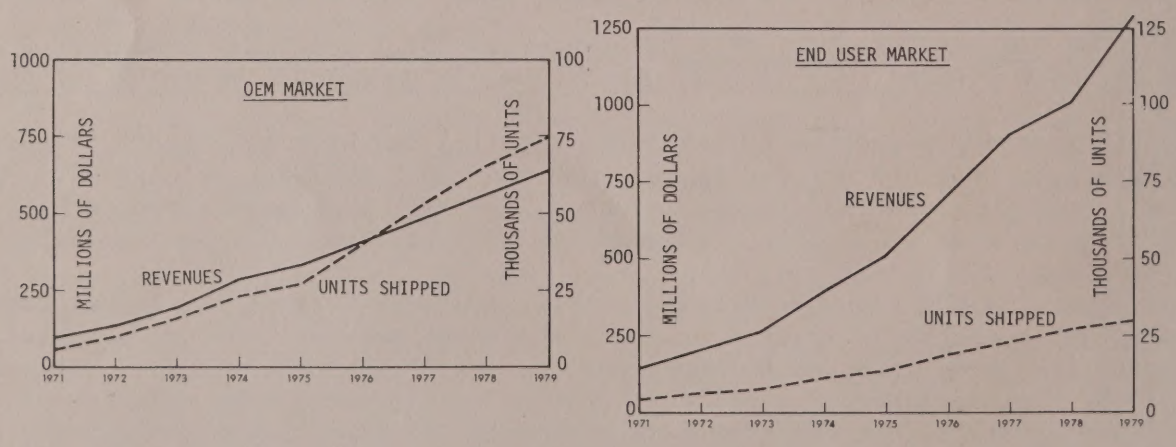
- IBM is/isn't in the market. Though the System/7 et al often compete with minis, IBM hasn't historically been in the business as others know it. But as mini makers come up with S/32 competitors (some claim 370 competitors as well) and sell them through systems houses and distributorships, IBM is marketing 5100s . . . and inventing their successors.

Minis vs Group B

Throughout these pages EDP/IR refers to both dedicated-application computers (Group B) and minicomputers, often in a similar context. But the two are not interchangeable. Dedicated-application computers are those toted up semiannually in EDP/IR's Group B census (see page 11) . . . and pretty much include all those computers that aren't contained in the General-purpose (Group A) census.

Minicomputers, on the other hand, though a subset of Group B, are more rigidly defined by IDC, publisher of EDP/IR, as:

OEM/END-USER MINICOMPUTER SHIPMENTS AND REVENUES
(Copyright 1975 by International Data Corporation)



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WORLDWIDE COMPUTER MARKET (U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	$ Billion Value In Use
		WORLDWIDE		
1970	23,100	105,800	$ 6,715	$ 34.3
1971	27,800	129,200	7,077	38.6
1972	40,900	160,300	8,500	42.5
1973	54,130	204,800	9,570	47.9
1974	63,640	258,300	11,335	54.1
1975	74,650	324,600	$ 11,540	$ 62.1
1976	104,300	416,800	$ 12,750	$ 71.7
1977	142,500	549,100	14,850	82.6
1978	171,000	707,800	17,100	94.8
1979	197,000	889,900	19,500	108.4
1980	225,000	1,099,000	22,200	123.5
		UNITED STATES		
1970	14,600	68,300	$ 3,920	$ 23.0
1971	17,600	83,200	4,177	25.1
1972	27,400	104,000	5,360	26.8
1973	38,700	133,250	5,940	29.9
1974	44,900	168,800	7,040	33.6
1975	52,800	211,900	$ 6,685	$ 37.8
1976	72,800	270,500	$ 7,350	$ 43.1
1977	97,200	354,400	8,510	49.0
1978	114,100	450,800	9,710	55.6
1979	131,100	558,500	10,930	62.8
1980	150,400	680,000	12,250	70.7
		INTERNATIONAL		
1970	8,500	37,500	$ 2,795	$ 11.3
1971	10,200	46,000	2,900	13.5
1972	13,500	56,300	3,140	15.7
1973	15,430	71,550	3,630	18.0
1974	18,740	89,500	4,295	20.5
1975	21,850	112,700	$ 4,830	$ 24.3
1976	[illegible]	145,300	$ 5,400	$ 28.6
1977	45,300	194,700	6,340	33.6
1978	56,900	257,000	7,390	39.2
1979	65,900	331,400	8,570	45.6
1980	74,600	419,000	9,950	52.8

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GENERAL-PURPOSE COMPUTER MARKET (GROUP A)
(U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	$ Billion Value In Use
		WORLDWIDE		
1970	12,000	74,800	$ 6,300	$ 32.4
1971	14,300	85,200	6,700	36.3
1972	18,300	94,800	8,000	39.8
1973	20,230	106,800	8,800	44.5
1974	14,320	112,400	10,100	49.5
1975	17,650	122,600	$ 9,940	$ 56.0
1976	28,300	143,000	$ 10,550	$ 63.5
1977	38,000	173,500	12,000	71.6
1978	37,000	200,000	13,600	80.4
1979	34,000	221,000	15,300	89.9
1980	33,000	240,000	17,100	100.0
		UNITED STATES		
1970	5,700	43,800	$ 3,600	$ 21.5
1971	7,600	49,200	3,900	23.3
1972	10,700	54,000	5,000	24.7
1973	14,000	62,250	5,400	27.3
1974	8,900	65,600	6,200	30.2
1975	12,400	71,900	$ 5,615	$ 33.5
1976	17,300	84,200	$ 5,850	$ 37.4
1977	22,000	102,000	6,600	41.5
1978	19,000	115,500	7,400	45.9
1979	17,000	125,000	8,200	50.6
1980	16,000	132,000	9,000	55.5
		INTERNATIONAL		
1970	6,300	31,000	$ 2,700	$ 10.9
1971	6,700	36,000	2,800	13.0
1972	7,600	40,800	3,000	15.1
1973	6,230	44,550	3,400	17.2
1974	5,420	46,800	3,900	19.3
1975	5,250	50,700	$ 4,300	$ 22.5
1976	11,000	58,800	$ 4,700	$ 26.1
1977	16,000	71,500	5,400	30.1
1978	18,000	84,500	6,200	34.5
1979	17,000	96,000	7,100	39.3
1980	17,000	108,000	8,100	44.5

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DEDICATED-APPLICATION COMPUTER MARKET (GROUP B)
(U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	$ Billion Value In Use
		WORLDWIDE		
1970	11,100	31,000	$ 415	$ 1.9
1971	13,500	44,000	377	2.3
1972	22,600	65,500	500	2.7
1973	33,900	98,000	770	3.4
1974	49,320	145,900	1235	4.6
1975	57,000	202,000	$ 1600	$ 6.1
1976	76,000	272,800	$ 2200	$ 8.2
1977	104,500	375,600	2850	11.0
1978	134,000	507,800	3500	14.4
1979	163,000	668,900	4200	18.5
1980	192,000	859,000	5100	23.5
		UNITED STATES		
1970	8,900	24,500	$ 320	$ 1.5
1971	10,000	34,000	277	1.8
1972	16,700	50,000	360	2.1
1973	24,700	71,000	540	2.6
1974	36,000	103,200	840	3.4
1975	40,400	140,000	$ 1070	$ 4.3
1976	55,500	186,300	$ 1500	$ 5.7
1977	75,200	252,400	1910	7.5
1978	95,100	335,300	2310	9.7
1979	114,100	433,500	2730	12.2
1980	134,400	548,000	3250	15.2
		INTERNATIONAL		
1970	2,200	6,500	$ 95	$ 0.4
1971	3,500	10,000	100	0.5
1972	5,900	15,500	140	0.6
1973	9,200	27,000	230	0.8
1974	13,320	42,700	395	1.2
1975	16,600	62,000	$ 530	$ 1.8
1976	20,500	86,500	$ 700	$ 2.5
1977	29,300	123,200	940	3.5
1978	38,900	172,500	1190	4.7
1979	48,900	235,400	1470	6.3
1980	57,600	311,000	1850	8.3

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WORLDWIDE MINICOMPUTER MARKET -- 1975 ACTIVITY
(Estimates of Units Shipped and $ Million Revenues; Copyright 1975 by IDC)

Company	Revenues	% Total	75-74 Growth	Units	% Total
Digital Equip.	$500M	37%	27%	16,500	32%
Hewlett-Packard	235	18	57	6,000	12
Data General	113	8	23	4,800	9
Honeywell	62	5	24	925	2
General Aut.	59	4	(-8)	2,700	5
Texas Instr.	55	4	6	2,700	5
Interdata	43	3	30	1,700	3
ModComp	38	3	46	875	2
Varian	37	3	9	1,000	2
CDC	30	2	100	300	1
Computer Aut.	26	2	18	5,000	10
Raytheon	23	2	28	300	1
Microdata	17	1	13	2,050	4
Harris	15	1	25	250	-
Others	97	7	3	5,900	12
TOTALS	1,350	100%	27%	51,000	100%

+ General-purpose by design; sold as a tool, not just a solution
+ Available as a system, with operating software and peripherals
+ Offered with OEM discounts; generally sold, not leased
+ Offered with a random-access memory of 4K words or more
+ Under $25,000 in base price, or in family with some members which are under $25,000 in base price

So not all Group B computers are minis -- IBM's S/7 being the most notable example. But note the ratio of minicomputer revenues to Group B shipments. In 1975 they were 85% of Group B shipments, but by 1980 they should be 98%.

Enter the "Supermini"

The mid-range mini is still the dynamo behind minicomputer and Group B shipments -- over 80% of mini system revenues in 1975. But by 1980, predicts IDC, "superminis" of the DEC PDP-11/70 class -- HP 3000s, Interdata 8/32s, Varian V75s, etc. -- will account for 37% of system revenues. Mid-range minis will be down to 54% by then, "micro-minis" will take up the slack.

Though no one foresees armies of large-scale minis replacing regular Group A mainframes en masse, their judicious use -- in distributed and transaction processing especially -- will be a growing option for the corporate user.

But instead of one-to-one replacement of 360s or 370s, the use of "superminis" is more likely to be part and parcel of a wholesale corporate reorganization to decentralized operations. As in the well-publicized case at New York's Citibank -- -- where 8 Interdata 8/32s and 6 IBM 370/145s will replace twin 370/165s -- minis will be used as tools in distributing corporate DP power to where it's needed.

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DEDICATED APPLICATION DIGITAL COMPUTER CENSUS

The data below was compiled from the best information available to IDC; questions and/or comments should be directed to Chris Whichard, Census Editor. Dedicated Application (Group B) computers are those commonly referred to as minicomputers, plus certain larger systems designed primarily for one application such as process control, data communications, or data entry. Group B computers -- though general-purpose by design -- are typically word-oriented (8, 12, 16, or 24 bits/word), usually sold outright, and predominantly programmed in machine language. Exceptions do occur, however . . . and, it seems, more and more often.

Indeed, definition is becoming increasingly more difficult, and subjective judgment is necessary. For example, office accounting machines such as Burroughs' E and L Series or TC-500, NCR's 399, or Nixdorf's 820 are excluded. Included, however, are "data entry" oriented machines such as the Eldorado 140, Four-Phase IV-40, and MAI Basic/Four, since they compete with other "minis" yet do not fit EDP/IR's description of General Purpose (Group A) computers. Note that IBM's S/32 is a Group A computer.

Price Classes: (1) $25,000 (2) $25-50,000 (3) $50-100,000 (4) $100,000 and up; Average System Value

Manufacturers with numbers or information that differs from that shown below are encouraged to contact Chris Whichard, Census Editor, with more correct or updated information. All comments are appreciated.

AS OF JANUARY 1, 1976

NAME OF MANUFACTURER	COMPUTER MODEL	NOTES	BITS PER WORD	PRICE CLASS	PURCHASE PRICE ($1,000) BASIC	PURCHASE PRICE ($1,000) AVERAGE	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Adage, Inc.	AGT-10 Series						4/68	32	3	35	X
	AGT-100 Series			4	100	165	1/72	21	15	36	X
	300			4	107	165	3/75	14	3	17	5
	400			2	30	37	3/74	25	5	30	5
Apeco (Cascade)	80/20	*	8	2	28	35	1/70	]	]	]	]
	80/30	*	8	2	31	40	1/70	] 150	] 75	] 225	] X
	80/40	*	16	3	46	57	1/70	]	]	]	]
Autonetics	Recomp-II		40	4	95	127	11/68	30	5	35	X
	Recomp-III		40	3	65	94	6/61	7	2	9	X
Bailey Meter	750		25	4	40	110	6/60	38	15	53	X
	755		25	4	80	130	11/61	7	2	9	X
	756		25	4	90	150	2/65	17	12	29	X
	855/15		16	4	24	135	12/72	1	9	10	5
	855/25		25	4	100	400	4/68	16	0	16	X
	855/50		25	4	100	400	3/72	6	0	6	7
	1055		32	4	250	500	3/76	1	-	1	19
Bendix	BDX-6200		20	3	25	60	5/70	40+	0	40+	NA
	BDX-9000		16	1	6	15	/71	8+	0	8+	NA
Bunker Ramo	230		15	4		134	8/63	4	-	4	X
	300		29	4		275	3/59	3	-	3	X
	330		29	4		275	12/60	6	-	6	X
	340		29	4		375	12/63	15	-	15	X
	1018		18	1		23	12/71	10	-	10	NA
	Subtotal							38	-	38	
Cincinnati Milacron	CIP-2000 Series	a	8	1	4	12	7/69	450	100	550	NA
Clary Data Systems	404	*	16	2	6	30	1/70	100	32	132	NA
Collins Radio	8311			1	15	17	1/68	NA	NA	NA	NA
	8400			4		950	11/62	25	8	33	X
	8500		32	4	200	1,000	1/67	53	16	69	X
Compiler Systems Corp.	CSI-16		16	1	11	20	11/70	80	10	90	NA
	CSI-24		24	2	15	30	12/70	35	5	40	NA
Computer Automation Inc.	108/208/808		8	1	5	11	4/68	280	30	310	X
	116		16	1	8	16	8/70	200	50	250	NA
	216		16	1	8	20	7/69	350	45	395	X
	816		16	1	10	15	12/68	40	5	45	X
	Alpha-8		8	1	3	4	5/72	]	]	]	] NA
	Alpha-16		16	1	4	9	10/71	] 3,180	] 850	] 4,030	]
	Naked Mini-8		8	1	2	3	5/72	]	]	]	]
	Naked Mini-16		16	1	3	7	10/71	] 4,250	] 860	] 5,110	] NA
	Alpha-LSI		16	1	2		12/73	]	]	]	]
	Other							1,250	380	1,630	NA
	Subtotal							9,550	2,220	11,770	
Computer Development	CD-2000		8	1	7	10	8/70	450	NA	450	NA
Computer Logic Systems	CLS-18		18	1	9	14	3/71	NA	0	NA	NA
Computer Signal Processors	CSP-30		16	3	35	80	6/70	45	NA	45	10
	MAP		32	1	14	25	6/75	10	NA	10	NA
Comtec	CT/90		16	3	50	85	1/72	NA	0	NA	NA
Comten, Inc.	20		16+2	3	35	80	3/71	35	15	50	NA
	40/45		32+4	4	93	240	8/69	36	0	36	NA
	60/65		32+4	4	138	350	9/69	14	0	14	NA
	476		32+4	4	76	280	8/75	6	0	6	NA
	3650		16+2	3	43	90	3/75	43	2	45	NA
	3670		16+2	4	71	150	3/72	145	0	145	NA
Consultronics (Sc. Control Corp.)	600 Series		24	3	31	80	10/65	180	50	230	NA
	4700		16	3	15	72	4/69	18	0	18	NA
	DCT-132		8	2	28	36	5/69	75	65	140	NA
Control Data Corp.	160		12	4	60	112	5/60	49	11	60	X
	160-A		12	4	90	225	7/61	200	65	265	X
	160-G		13	4		535	3/64	34	1	35	X
	924/A		26	4		430	8/61	26	1	27	X
	1700		16+2	4	37	160	3/66	290	180	470	X
	1700-SC		16+2	3	20	60	9/70	150	130	280	X
	System 17		16+2	2	14	39	2/74	110	165	275	NA
	8090		12	3		90	5/64	116	89	205	X
	8092		8	3		67	6/64	56	14	70	X
	G15		29	3		61	7/55	265	30	295	X
	LGP-21		32	2		42	12/62	140	35	175	X
	LGP-30		32	3	49	59	8/56	290	43	333	X
	RPC-4000		32	4	87	101	10/60	61	12	73	X
	CSC-46/136/636		15	4		280	/54	27	3	30	X
	Elbit-100		12	1	6	8	6/67	5	445	450	X
	Cyber 1000/M-1000		24	4	250	365	/68	75	40	115	NA
	Subtotal							1,894	1,264	3,158	
Data General Corp.	Nova		16	1	6	12	2/69	750	620	1,370	Neg
	Nova-800		16	1	7	18	3/71	1,330	310	1,640	125
	Nova-820		16	2	12	28	4/72	905	265	1,170	100
	Nova-840		16	2	16	45	7/73	810	235	1,045	100
	Nova-1200		16	1	6	20	12/70	4,185	1,140	5,325	400
	Nova-1210/1220		16	1	3	8	2/72	3,475	1,025	4,500	400
	Nova-1230		16	1	6	12	12/71	320	95	415	50
	Supernova		16	1	9	25	4/70	190	85	275	Neg
	Supernova-SC		16	2	16	30	6/71	220	110	330	15
	Nova-2/4		16	1	3	5	10/73	1,450	560	2,010	150
	Nova-2/10		16	1	5	14	10/73	1,180	545	1,725	100
	Nova-3/4		16	1	2	3	1/76	-	-	-	200
	Nova-3/12		16	1	12	16	1/76	-	-	-	150
	Eclipse-S/100		16	2	12	30	2/75	100	30	130	150
	Eclipse-S/200		16	2	16	45	2/75	100	30	130	100
	Eclipse-S/300		16	2	24	95	2/75	25	10	35	50
	Subtotal							15,040	5,060	20,100	2,090
Datamate Computer Systems	DM-16		16	2	17	26	11/69	12	0	12	X
	DM-70		16	1	9	15	12/70	25+	0	25+	NA
	DM-70/ROM		16	1	4	6	10/70	NA	0	NA	NA
	ECP-18		18	1	14	16	11/66	21	0	21	X
	2400		24+3	1	15			NA	0	NA	NA
Data Technology	1600		8	1	6	22	9/68	NA	0	NA	NA

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Digiac Corp.	3060		1	1	9	13	1/70	70	20	90	NA
	3080		25	1	20	25	12/64	14	2	16	X
	3080-C		25	2	26	37	10/67	8	2	10	X
	3090			1	5		2/74	10	0	10	NA
Digital Computer Controls	D-112		12	1	3	12	8/70	2,425	405	2,830	750
	D-116		16	1	3	12	2/72	3,720	695	4,415	
Digital Equipment	PDP-1		18	4	120	136	11/60	35	6	41	X
	PDP-4		18	3		74	8/62	30	3	33	X
	PDP-5		12	2	30	36	9/63	61	29	90	X
	PDP-7		18	3		66	11/64	69	46	115	X
	PDP-8, i,l,s		12	2	8	27	5/65	5,765	3,685	9,450	X
	PDP-8/e,f,m		12	1	4	12	4/71	14,090	6,760	20,850	1,500
	PDP-9/Linc		12	2	38	48	9/66	88	46	134	X
	PDP-9 & 9L		18	2	35	50	12/66	290	160	450	X
	PDP-11-05 & 10		16	1	5/7	12	2/72	8,600	5,100	13,700	1,100
	PDP-15 & 20		16	1	3/11	16	3/70	2,850	1,510	4,360	200
	PDP-35 & 40		16	2	9/13	30	1/73	4,050	1,900	5,950	700
	PDP-45 & 50		16	3	24/32	80	4/72	1,660	640	2,300	350
	PDP-12		12	2	13	45	4/69	505	250	755	Neg
	PDP-15		18	3	15	75	2/70	500	275	775	50
	PDP-8/A						10/74	1,200	300	1,500	800
	PDP-11/70						7/75	50	10	60	NA
	LSI-11						6/75	900	100	1,000	150
	Subtotal							40,743	20,820	61,563	
Digital Scientific Corp.	Meta-4		16	3	29	90	4/70	140	15	155	10
Dynamic Research	DPC-44		24	2		36	7/68	NA	0	NA	NA
Eldorado	140/200	*	8	2	18	30	1/70	290	100	390	25
Electronic Associates Inc.	640		16	3	27	55	6/67	110	61	171	X
	1020		16	1	20	25	2/64	100	25	125	X
	8400		32	4	200	450	6/65	21	8	29	X
	Pacer-100		16	2	15	40	5/72	125	100	225	15
Electronic Processors Inc.	EPI-118		18	1	3	14	11/70	NA	0	NA	NA
	EPI-218		18	1	4	14	1/72	NA	0	NA	NA
EMR	210		12	4	94	132	4/62	9	0	9	X
	420		42	4	324	450	6/63	3	0	3	X
	2100		21	4	65	143	12/63	8	0	8	X
Foto-Mem Inc.	Centaur-100		8	1	6	20	4/70	25	0	25	NA
Four-Phase Systems	IV/40		24	3	16	55	6/63	1,500	300	1,800	NA
	IV/70	*	24	3	16	60	3/71				
Foxboro	Fox-1		24	4	95	260	10/72	NA	NA	NA	NA
	2/10		16	2	30	50	11/72	NA	NA	NA	NA
	2/20		16	3	50	100	9/72	NA	NA	NA	NA
General Automation Inc.	GA-18/30		16	2	18	50	7/69	620	140	760	Neg
	SPC-12		8	1	4	16	1/68	3,625	925	4,550	100
	SPC-16		16	1	8	25	5/70	4,750	900	5,650	500
	16/110		16	1	1	-	12/75	50	20	70	NA
	16/220		16	1	2	-	1/76	-	-	-	NA
	16/330		16	1	3	-	1/76	-	-	-	NA
	16/440		16	1	6	-	7/75	100	30	130	NA
GRI Computer	909 Series		16	1	4	9	1/70	320	150	470	25
	99/30		16	1	5	15	6/72	365	170	535	75
	99/40		16	1	6	17	6/72	115	50	165	25
GT&E (Tempo)	I		16	2	14	36	1/70	90	30	120	NA
	II		16	1	6	10	6/72	40	20	60	NA
	IS-7000		16	1	8	13	6/72	NA	NA	NA	NA
Harris	6024/1		24	4	69	135	5/69	22	0	22	0
	6024/3		24	3	49	90	2/70	119	0	119	0
	Slash 4		24	4	24	110	8/73	112	8	120	43
	Slash 5		24	3	16	50	5/72	273	12	285	27
	Slash 7		24	4	45	180	10/75	5	0	5	4
	Series 100			4	NA	NA	7/75	10	2	12	6
	Series 200			4	NA	NA	12/75	6	0	6	4
	Subtotal							547	22	569	
Hewlett-Packard	2107-A	e	16	2	20	40	8/68	10	10	20	X
	2100-A		16	1	7	15	6/71	7,500	3,225	10,725	700
	2100-S		16	2	16	35	8/73	1,600	1,270	2,870	350
	2114-A		16	1	10	16	5/68	505	310	815	X
	2114-B		16	1	9	15	10/68	530	185	715	X
	2115-A		16	2	15	26	11/67	240	100	340	X
	2116-A		16	2	22	32	11/66	265	200	465	X
	2116-B		16	2	24	40	8/68	450	255	705	X
	2116-C		16	2	20	45	11/69	505	95	600	X
	21-MX							600	325	925	100
	3000		16	4	100	185	11/72	135	45	180	30
	Subtotal							12,340	6,020	18,360	
HIS GE/PAC	30	b	8	1	7	35	5/69	225	50	275	NA
	312		20	4		200	3/60	27	6	33	X
	412		20	4		300	7/62	39	8	47	X
	3010	c	16	3	13	90	5/70	25	1	26	X
	3010/2	d	16	4	15	140	12/71	NA	NA	NA	NA
	4010		24	4	76	200	10/70	33	5	38	NA
	4020		24	4	79	250	2/67	200	60	260	X
	4040		24	4		120	8/64	45	20	65	X
	4050		24	4		280	12/66	23	3	26	X
	4060		24	4		340	6/65	18	6	24	X
	4070		24	4	300	1,000		NA	NA	NA	NA
	4401		24	4		235	9/74	NA	NA	NA	NA
	4402		24	4		500		NA	NA	NA	NA
	Subtotal							635	159	794	
Honeywell	19		19	4		140	5/61	3	0	3	X
	21		20	3		63	2/66	41	25	66	X
	24		24	4		200	5/63	82	3	85	X
	112		12	1	5	10	11/69	222	48	270	X
	116		16	3		65	4/68	172	35	207	X
	124		24	4	65	130	3/66	109	18	127	X
	224		24	4	75	380	3/65	55	8	63	X
	290		18	4		175	11/60	10	2	12	X
	316		16	2	8	45	6/69	1,300	715	2,015	X
	324		24	4	175	250	7/68	12	0	12	X
	416		16	2	17	43	4/67	198	130	328	X
	516		16	3	24	95	10/66	735	415	1,150	X
	632		32	4	97	450	12/68	10	4	14	X
	700 Series		16	3	16	65	6/72	1,390	900	2,290	350
	164X Series	g	16	4	144	440	12/69	20	8	28	X
	6/06		16	2	7.5	42	1/76	-	-	-	
	6/34		16	1	2.6	18	1/76	-	-	-	400
	6/36		16	2	2.6	40	1/76	-	-	-	
	Subtotal							4,359	2,311	6,670	
IBM	1710/1720		6	4		225	2/62	8	10	18	X
	1800		16+2	4	47	235	2/66	550	380	930	X
	System/7		16	3	17	60	11/71	5,475	2,025	7,500	1,000
Imlac	PDS-1		16	1	10	11	2/70	NA	NA	NA	NA
	PDS-4	h	16	1	17	21	12/73	NA	NA	NA	NA
Information Technology, Inc.	4900/5		8	1	3	5	10/70	NA	0	NA	NA
	4900/10		16	1	10	20	10/65	25	0	25	X
	4900/20		12/32	2	30	50	10/69	20+	0	20+	X
Infotronics	Mini/Maxi		16	1		25	7/70	NA	0	NA	NA
Interdata	1		8	1	4	11	9/70	235	85	320	X
	2		16	1	11	14	7/68	20	0	20	X
	3		16	1	13	20	5/67	200	5	205	X
	4		16	1	9	21	8/68	300	125	425	X
	5		16	1	11	25	11/70	80	20	100	X
	15		16	2	22	35	9/69	40	24	64	X
	16/18		16	2	15	30	8/71	3	13	16	X
	50		16+1	1	7	19	4/72	120	35	155	20
	55		16+1	2	16	40	8/72	100	30	130	20
	70		16	3	9	65	12/71	950	285	1,235	150
	74		16	2	3	34	2/73	377	73	450	65
	80		16	2	15	44	7/72	100	25	125	15
	85		16	3	23	60	7/73	50	10	60	15
	7/16		16	2	3	35	2/74	745	125	870	150
	7/32		16	3	10	73	7/74	375	75	450	50
	8/32							25	0	25	20
	6/16		16	1	2		1/76	-	-	-	NA
Interplex	System-1		16	2		47	9/70	NA	0	NA	NA
Linolex	Model A	*	8	2	10	30	8/72	75	50	125+	NA

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Lockheed Electronics	MAC-16		16	1	11	22	3/69	315	35	350	X
	MAC-Jr		16	1	8	16	1/71	1,300	250	1,550	50
	Sue-IIILX		16	1	6	10	9/72	600	110	710	50
	Sys-III-1		16	2	42	50	1/73	400	40	440	NA
	Sys-III-2		16	3	61	70	1/75	120	35	155	NA
	Sys-III-3		16	3	84	90	7/75	35	5	40	NA
	Subtotal							2,770	475	3,245	
MAI - Basic/Four	Basic/Four	*	8	2	34	46	8/71	1,000	1,000	2,000	300
Memorex	MRX-40	*	16	4	91	180	8/72	18	18	36	X
	MRX-50	*	16	4	104	250	8/72	8	12	20	X
Microdata Corp.	400 Series		8	1	3	4	1/70	155	0	155	X
	800 Series		8	1	6	11	5/69	2,055	1,380	3,435	X
	1600 Series		8	1	5	11	2/72	3,800	750	4,550	350
	3200 Series		16	1	8	14	3/74	100	50	150	40
	Micro-1		8	1	1	3	11/74	800	120	920	400
	Subtotal							6,910	2,300	9,210	
Mini Comp	Administrator-2		16	3	35	52	12/70	NA	0	NA	NA
	MD-708		8	1	5	7	8/70	50	0	50	NA
	Multi User-E		16	3	67	85	11/70	NA	0	NA	NA
	Multi User-I		16	3	40	58	1/71	NA	0	NA	NA
Modular Computer Systems	Modcomp-I		16	1	2	9	10/71	525	225	750	NA
	Modcomp-II		16	1	4	22	3/71	455	195	650	NA
	Modcomp-III		16	2	13	44	12/70	119	51	170	NA
	Modcomp-IV		16/32	3	19	89	5/74	140	60	200	NA
	Subtotal							1,239	531	1,770	
Monroe	XI	*	32	2	21	28	5/60	250	200	450	X
Motorola Comm. Div.	MDP-1000		8	1	8	19	2/69	75	0	75+	X
	MC-6800		8	1	5			NA	0	NA	NA
Nanodata	QM-1		18	4	75	150	/73	NA	0	NA	NA
Nuclear Data, Inc.	ND-812		12	1	7	15	3/71	375	150	525	NA
Omnicomp Computer Corp.	Omnus-1		16	1	8	12	8/71	NA	0	NA	NA
Philips	P-850 Series	*	16	1	3	15	4/71	200	50+	250	NA
Prime	100		16	1	4	7	4/73	180	200	380	NA
	200		16	1	6	17	11/12	172	50	222	NA
	300		16	3	12	57	9/73	108	70	178	NA
Qantel Corp.	Quantel-V	*	8	2	14	30	6/70	80	0	80	NA
	Answer	*	8	2	12	27	5/72	120	0	120	NA
	S-1100	i	8	2	30	35	1/74	80	10	90	NA
	S-1200	i	8	2	34	42	1/74	100	20	120	10
	S-800	i	8	1	19	19	6/75	30	5	35	5
	S-900	i	8	2	25	32	6/75	30	5	35	10
Raytheon	703		16	1	13	23	10/66	179	33	212	X
	704		16	1	10	18	3/70	675	200	875	NA
	706		16	2	19	30	5/69	75	17	92	X
	PB-250		22	2	33	48	12/60	115	20	135	X
	PB-440		24	4		140	3/64	20	2	22	X
	PB-520		24	4		128	10/65	26	1	27	X
	RDS-500		16	1	8	14	12/73	175	55	230	NA
	Subtotal							1,265	328	1,593	
Redcor Corp.	RC-70		16+2	2	15	30	7/68	100	40	140	X
Rolm Corp.	1601	j	16	2	13	28	3/70	1,016	671	1,687	NA
	1602	j	16	3	18	55	2/73	126	130	256	NA
	1603	j	16	1	10	20	10/74	10	14	24	NA
	1664	j	16	3	32	75	3/76	-	-	-	NA
Sanders	Series-200		16+2	4	57	120	3/69	NA	NA	NA	X
	Series-300		16				12/71	NA	NA	NA	NA
	MIP-16		16	2	15	30		NA	NA	NA	NA
Spear	Microline		12	3	46	57	6/66	NA	NA	NA	X
Spiras Systems/USM	65		16	2	19	40	8/69	NA	NA	NA	X
Systems Computer Corp.	500		8				6/72	NA	0	NA	NA
	1000		8	1	4		1/71	400	200	600	NA
	1500		8				6/72	NA	0	NA	NA
Sys. Engineering Labs.	810		16	2	38	45	9/65	24	6	30	X
	810-A		16	3	18	90	4/67	236	10	246	X
	810-B		18	4	30	150	12/68	168	10	178	X
	840		24	3	65	80	11/65	3	0	3	X
	840-A		24	3	60	75	8/66	36	4	40	X
	840-MP		24	4	49	260	12/67	33	0	33	X
	85		32	4	150	240	7/72	25	5	30	NA
	86		32	4	200	325	6/70	50	6	56	NA
	88		32	4	350	600	3/71	6	2	8	NA
	32		32	3	25	70	8/75	-	-	-	NA
	Subtotal							581	43	624	
Tenet	210		32	4	200	385	8/71	NA	0	NA	NA
Texas Instruments	960-A&B		16	2	14	30	6/70	2,450	1,050	3,500	NA
	980-A&B		16	2	17	40	5/68	2,730	1,170	3,900	NA
	990/4		16	1	2		3/76	-	-	-	NA
	990/10		16	1	3		3/76	-	-	-	NA
Unicom Inc.	CP-8A		8	1	3		2/70	105	55	160	NA
	CP-8B		8	1	3		3/70	78	30	108	NA
	CP-8C		8	1	5		3/70	130	70	200	NA
	CP-8D		8	1	7		4/70	30	10	40	NA
	Subtotal							343	165	508	
Unicomp Inc.	Comp-16		16	2	11	29	6/70	26	0	26	X
	Comp-18		18	2	12	38	8/70	38	0	38	X
Univac (EMR)	6130/6135		16+2	4	85	200	3/66	60	38	98	X
	6140/6145		16	4	60	120	6/72	NA	NA	NA	NA
	6020		24	4	72	175	4/65	13	3	16	X
	6040		24	4	98	225	7/65	9	1	10	X
	6050		24	4	123	360	2/66	17	6	23	X
	6070		24	4	240	600	10/65	1	3	4	X
Varian	520/i		16	1	6	13	9/68	330	170	500	X
	620/a		16	3		75	12/65	120	30	150	X
	620/f		17+1	1	11	25	6/70	170	80	250	X
	620/f-100		16	1	10	22	6/72	275	125	400	NA
	620/i		16+2	1	10	20	12/65	920	380	1,300	X
	620/L & 100c		16	1	5	12	2/71	680	300	980	NA
	620/L-100		16	1	6	14	6/72	610	300	910	NA
	R-620 * 622/i		16+2	2	15	29	6/69	140	60	200	X
	V-72				10		2/74	250	100	350	NA
	V-73						11/72	500	220	720	NA
	V-74			3	40		5/74	80	40	120	NA
	V-75							50	20	70	NA
	V-76							NA	NA	NA	NA
	Subtotal							4,125	1,825	5,950	
Varisystems	PAC-16	k	16	1	4		9/69	NA	0	NA	X
Wang Labs	WCS/10		8	1	6.1	10	5/74	500	-	500	NA
	WCS/20		8	1	11	18	5/74	350	-	350	NA
	WCS/30		8	2	30	35	5/74	300	-	300	NA
Westinghouse	P-50		14	1	16	23	8/64	182	40	222	X
	P-250	l	16	3	40	62	9/67	48	20	68	X
	P-500 Series		18	4	85	110	6/63	33	12	45	X
	P-2000		16	2	10	27	8/69	111	90	201+	NA
	2500		16	2	10	30	11/71	110	45	155+	NA
	Subtotal							484	207	691	NA
Xerox	92		12	3		90	4/65	30	20	50	X
	910		24	4		120	8/62	140	40	180	X
	920		24	4		150	9/62	90	40	130	X
	925		24	4		200	12/64	10	4	14	X
	930		24	4	80	400	6/64	75	50	125	X
	CE-16 & A		16	1	8	23	6/69	35	10	45	X
	CF-16 & A	m	16	1	8	17	11/70	85	15	100	Neg
	Sigma-2		16	4	24	125	12/66	170	80	250	X
	Sigma-3		16	4	28	140	1/70	190	120	310	NA
	Subtotal							825	379	1,204	
XLO	Eight		8	1	4		1/71	NA	NA	NA	NA
TOTALS								145,507	57,257	202,764	

* primarily sold as "small business computer" and/or "intelligent terminal/data entry"
a. cross-licensed version of Microdata-800
b. cross-licensed version of Interdata-1
c. cross-licensed version of Interdata-4
d. cross-licensed version of Interdata-70
e. utilizes 2115-A or B (Educ. Basic Systems)
f. excluding 2000 and 2007 "system" configurations avoid double counting
g. utilizes two H-316s
h. interactive graphics display systems (freestanding or remote)
i. sold as standalone mini-based business system and as part of larger distributed processing network
j. software compatible with Data General/Nova
k. manufactured by Photon, Inc.
l. utilizes Xerox - Sigma-2
m. utilizes CAI-116

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General-Purpose Digital Computer (Group A) Census shown below are based on the best information available to IDC -- but are definitely estimates. Computer makers, as a rule, do not directly supply this type of data. Only through the use of IDC's extensive data files and other sources are estimates such as these possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. They are byte or character oriented -- except for large-scale scientific computers that have large words -- and are primarily programmed in higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and special-purpose machines.

Computer size classes are based on the IBM 370 product line -- rather than constantly shifting average system values -- and which of a manufacturer's models competes with which IBM machine. For example, a vendor's computer in Size Class 7 would more closely compete with an IBM 370/168 or 165 than any other IBM computer. Other classes can be readily checked under IBM's column.

AS OF JANURY 1, 1976

NAME OF MANUFACTURER	COMPUTER MODEL	CLASS	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Amdahl	470 V/6	7	$105,000	6/75	5	1	6	10
Burroughs	B-200	3	$ 5,600	11/61	43	55	100	X
	B-300	3	$ 5,200	7/65	240	45	285	X
	B-500	3	$ 6,000	11/68	390	435	825	X
	B-70X/71X	2	$ 1,300	3/73	475	175	650	100
	B-72X	2	$ 2,000	4/75	25	-	25	100
	B-1712	2	$ 2,100	8/72	225	100	325	100
	B-1714	2	$ 2,250	8/72	445	200	645	130
	B-1718	3	$ 3,500	11/74	30	15	45	55
	B-1726	3	$ 5,900	2/73	300	110	410	60
	B-1728	3	$ 8,300	8/73	180	40	220	50
	B-2500	4	$ 8,900	2/67	110	100	210	X
	B-2700	4	$ 8,700	8/67	380	120	300	40
	B-3500	4	$ 16,000	5/67	464	264	730	X
	B-3700	4	$ 22,600	11/72	225	110	335	20
	B-45/4700	5	$ 27,300	10/71	240	100	340	20
	B-4790	5	$ 41,000	11/75	5	-	5	40
	B-5500	5	$ 35,000	3/63	55	20	75	X
	B-5700	5	$ 29,500	12/70	25	15	40	X
	B-65/6700	6	$ 57,500	11/69	100	70	170	10
	B-7700	7	$120,000	8/73	10	2	12	] 5
	B-7750	7	$135,000	/75	1	-	1	]
	Subtotal				3,971	1,977	5,948	730
CDC	G-20	4	$ 19,600	4/61	3	3	6	X
	1604/A/B	6	$ 42,000	1/60	11	4	15	X
	31/3150	4	$ 9,100	12/74	72	45	117	X
	3170	5	$ 19,200	12/70	11	12	23	X
	3200	4	$ 14,700	5/64	43	38	81	X
	3300	5	$ 29,900	9/65	100	86	186	X
	3400	5	$ 23,700	11/64	4	7	11	X
	3500	5	$ 26,000	1/69	15	15	30	X
	3600	6	$ 49,000	6/63	15	12	27	X
	3800	6	$ 53,000	12/65	17	3	20	X
	6200	6	$ 39,000	11/70	-	6	6	X
	Cyber-72	5	$ 36,300	10/71	25	70	95	5
	Cyber-172	6	$ 41,200	7/75	4	11	15	15
	6400	6	$ 54,000	5/66	58	55	113	X
	Cyber-73	6	$ 51,700	3/72	28	35	63	2
	Cyber-173	6	$ 54,600	9/75	2	2	4	20
	6500	6	$ 74,800	12/67	20	13	33	X
	6600	7	$119,600	8/64	56	30	86	X
	Cyber-74	7	$115,500	3/72	10	6	16	1
	Cyber-174	6	$ 67,500	9/75	0	1	1	5
	Cyber-175	7	$ 84,000	8/75	2	2	4	5
	6700	7	$125,000	7/70	2	-	2	X
	7600	7	$171,600	1/69	20	6	26	X
	Cyber-76	7	$165,000	3/72	3	4	7	2
	Star-100	7	$250,000	12/73	1	1	2	1
	Subtotal				522	467	989	56
Digital Equipment Corporation	PDP-6	4	$ 10,000	10/64	14	10	24	X
	1040/1050	4	$ 13,300	10/67	] 240	] 110	] 350	10
	1055	4	$ 22,000	12/71	]	]	]	
	1060/1070/1077	5	$ 30,000	6/72	73	37	110	10
	1080/1090	6	$ 30,000	6/75	12	3	15	5
	Subtotal				339	160	499	25
HIS	Gamma 10	2	$ 2,500	7/64	-	835	835	X
	Gamma 30	4	$ 10,100	2/62	-	115	115	X
	G-5X Series	2	$ 1,650	1/66	625	2,800	3,425	X
	G-100 Series	3	$ 4,100	4/66	200	1,400	1,600	X
	G-200 Series	4	$ 14,000	4/61	140	40	180	X
	G-400 Series	4	$ 16,650	5/64	235	300	535	X
	G-615/25/35/45	6	$ 73,300	4/65	40	36	76	X
	G-6025	5	$ 22,200	11/73	35	15	50	X
	G-6030/40	5	$ 37,000	6/71	65	128	193	X
	G-6050/60	6	$ 52,000	7/71	100	55	155	X
	G-6070/80	6	$ 68,900	7/71	40	12	52	X
	G-6180	7	$102,000	2/74	3	-	3	X
	G-Subtotal				1,483	5,736	7,219	X
	H-105/115	3	$ 4,350	3/70	950	500	1,450	X
	H-110/120	3	$ 4,050	1/66	310	240	550	X
	H-125	3	$ 8,400	12/67	50	215	265	X
	H-200	3	$ 6,500	3/64	340	195	535	X
	H-2020	3	$ 2,400	2/73	510	80	590	X
	H-2030	3	$ 5,150	1/73	100	30	130	X
	H-2040	4	$ 9,900	4/72	335	115	450	X
	H-1015	4	$ 12,750	4/71	75	50	125	X
	H-2050	4	$ 14,800	4/72	200	75	275	X
	H-12/1250	4	$ 12,700	2/66	270	125	395	X
	H-2105	4	$ 18,300	2/71	95	45	140	X
	H-2060	4	$ 21,000	4/72	90	25	115	X
	H-2200	4	$ 20,000	1/66	110	40	150	X
	H-2070	5	$ 25,300	5/72	65	5	70	X
	H-3200	5	$ 27,400	2/70	80	25	105	X
	H-4200	5	$ 31,600	9/68	20	3	23	X
	H-2088	6	$ 44,900	/72	5	1	6	X
	H-8200	6	$ 74,500	2/69	20	4	24	X
	H-4/1400	4	$ 13,500	12/61	15	20	35	X
	H-800	5	$ 29,100	12/60	24	10	34	X
	H-1800	6	$ 46,900	7/64	7	4	11	X
	H-Subtotal				3,671	1,807	5,478	X
	Series 60							
	61/58	2	$ 1,950	1/75	90	225	315	] 200
	61/60	2	$ 3,300	1/75	60	220	280	]
	62/40	2	$ 3,800	1/75	20	10	30	] 400
	62/60	3	$ 4,300	1/75	45	35	80	]
	64/20	3	$ 7,400	1/75	25	45	70	] 290
	64/40	4	$ 12,700	1/75	5	15	20	]
	66/10	4	$ 18,300	1/75	15	10	25	]
	66/20	5	$ 23,300	1/75	55	40	95	] 200
	66/40	5	$ 36,200	1/75	60	80	140	]
	66/60	6	$ 48,800	1/75	50	10	60	]
	66/80	7	$ 90,000	1/75	10	3	13	] 5
	68/80	7	$100,000	1/75	2	-	2	]
	Subtotal Series 60				437	693	1,130	1095
	HIS Total				5,591	8,236	13,827	1095

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AS OF JANUARY 1, 1976

NAME MANUFACTURER	COMPUTER MODEL	CLASS	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
IBM	System/32	1	$ 900	3/75	5,000	450	5,450	10,000
	System 3/6	2	$ 1,750	12/70	2,750	1,500	4,250	X
	System 3/8	2	$ 1,900	6/75	1,200	400	1,600	1,500
	System 3/10	2	$ 2,550	1/70	16,700	7,600	24,300	X
	System 3/12	2	$ 3,250	3/76	-	-	-	500
	System 3/15	3	$ 4,650	3/74	2,850	700	3,550	1,500
	Subtotal				28,500	10,650	39,150	13,500
	370/115	3	$ 7,450	4/74	1,465	1,280	2,745	500
	370/125	4	$ 11,250	6/73	2,035	1,670	3,705	250
	370/135	4	$ 17,500	5/72	2,685	1,940	4,625	100
	370/145	5	$ 31,700	7/71	1,900	1,300	3,200	60
	370/155	6	$ 60,300	2/71	530	430	960	X
	370/158	6	$ 67,500	5/73	920	522	1,442	500
	370/165	7	$102,000	6/71	115	63	178	X
	370/168	7	$126,000	7/73	275	115	390	140
	370/195	7	$198,500	3/71	16	4	20	X
	Subtotal				9,941	7,324	17,265	1,550
	360/20	3	$ 3,675	12/65	1,735	4,050	5,785	X
	360/22	3	$ 5,900	7/71	310	215	525	X
	360/25	3	$ 7,650	10/68	225	860	1,085	X
	360/30	4	$ 11,400	6/65	2,340	2,000	4,340	X
	360/44	4	$ 14,500	7/66	47	54	101	X
	360/40	4	$ 20,000	6/65	1,175	1,495	2,670	X
	360/50	5	$ 32,700	8/65	555	460	1,015	X
	360/65	6	$ 70,700	11/65	405	200	605	X
	360/67	7	$114,200	6/66	27	13	40	X
	360/75	7	$ 95,900	1/66	28	14	42	X
	360/85	7	$143,800	10/69	5	3	8	X
	360/95	7	$153,000	11/67	13	2	15	X
	Subtotal				6,865	9,366	16,231	X
	1130	2	$ 2,350	2/66	2,000	1,665	3,665	X
	1401	3	$ 3,775	9/60	750	880	1,630	X
	1401-G	2	$ 2,350	5/64	45	24	69	X
	1401-H	2	$ 1,325	6/67	14	37	51	X
	1410	4	$ 17,350	11/61	70	45	115	X
	1440	3	$ 4,800	4/63	125	160	285	X
	1460	4	$ 10,000	10/63	30	32	62	X
	1620	3	$ 2,750	9/60	235	220	455	X
	7010	5	$ 26,500	10/63	9	6	15	X
	7030	7	$163,200	5/61	3	1	4	X
	704	5	$ 32,600	12/55	1	1	2	X
	7040	5	$ 25,500	6/63	8	15	23	X
	7044	5	$ 37,200	6/63	8	5	13	X
	705	5	$ 38,800	1/56	2	2	4	X
	7070-74	5	$ 27,500	3/60	100	30	130	X
	7080	6	$ 61,200	8/61	40	-	40	X
	7090-94	6	$ 71,900	8/60	50	10	60	X
	Subtotal				3,490	3,133	6,623	X
	Total IBM				48,796	30,473	79,269	15,050
NCR	8200	1	$ xx,xxx	9/75	275	175	450	600
	Century-50	2	$ 2,050	2/71	970	125	1,095	X
	Century-100	3	$ 2,980	9/68	565	900	1,465	X
	Century-101	3	$ 2,850	10/72	1,320	290	1,610	300
	Century-151	3	$ 3,500	2/75	100	40	140	75
	Century-200	4	$ 8,000	9/69	510	375	885	X
	Century-201	4	$ 10,000	8/74	220	25	245	70
	Century-251	4	$ 10,000	11/73	100	25	125	40
	Century-300	5	$ 22,600	2/72	53	30	85	2
	304	4	$ 10,000	1/60	4	-	4	X
	310	2	$ 1,000	5/61	12	10	22	X
	315	3	$ 5,000	5/62	250	225	475	X
	315-RMC	4	$ 11,800	9/65	40	45	85	X
	390	2	$ 800	5/61	15	100	115	X
	500	2	$ 1,150	10/65	590	1,350	1,940	X
	Subtotal				5,026	3,715	8,741	1,087
Philco	1000	3	$ 7,000	6/63	8	1	9	X
	210/211	5	$ 40,000	10/58	5	1	6	X
	212	5	$ 52,000	1/63	4	1	5	X
	Subtotal				17	3	20	X
Singer	System 10	2	$ 2,250	10/70	1,950	1,642	3,592	X
Standard Computer	IC-4000	3	$ 9,000	9/68	4	-	4	X
	IC-6000	4	$ 16,000	5/67	3	-	3	X
	IC-7000	4	$ 17,000	6/69	7	-	7	X
	Subtotal				14	-	14	X
Sperry Univac	I/II	4	$ 26,500	3/51	5	2	7	X
	III	4	$ 26,900	8/62	90	35	125	X
	SS-80/90	3	$ 8,500	8/58	5	15	20	X
	418-I/II/III	4	$ 14,500	6/63	102	110	212	X
	491/492	5	$ 28,600	12/61	14	7	21	X
	494	6	$ 44,300	2/66	50	45	95	X
	1004	2	$ 1,100	2/63	610	700	1,310	X
	1005	2	$ 1,730	4/66	490	185	675	X
	1050	3	$ 9,325	9/63	140	110	250	X
	1106	6	$ 42,400	12/69	90	150	240	10
	1107	6	$ 60,400	10/62	6	13	19	X
	1108	7	$ 72,800	9/65	130	105	235	X
	1110	7	$ 90,100	6/72	55	55	110	5
	9200	2	$ 2,530	6/67	1,000	900	1,900	X
	9300	3	$ 4,300	9/67	750	850	1,600	X
	9400	4	$ 12,300	5/69	200	300	500	X
	9700	5	$ 22,900	8/72	10	15	25	X
	90/30	4	$ 8,700	2/75	250	160	410	600
	90/60	5	$ 17,200	1/74	80	60	140	125
	90/70	5	$ 23,300	11/73	15	35	50	30
	1100/10	5	$ 35,000	4/76	-	-	-	50
	1100/20	6	$ 43,300	4/75	10	5	15	40
	1100/40	7	$113,300	7/75	2	1	3	35
	Subtotal				4,104	3,858	7,962	895
	301	4	$ 7,060	10/60	73	8	81	X
	501	5	$ 17,100	6/59	7	-	7	X
	3301	5	$ 24,100	7/64	51	-	51	X
	Spectra 70/15	3	$ 4,200	9/65	9	-	9	X
	Spectra 70/25	3	$ 7,400	9/65	1	1	2	X
	Spectra 70/35	4	$ 13,000	1/67	83	4	87	X
	Spectra 70/45	5	$ 24,000	11/65	221	10	231	X
	Spectra 70/46	5	$ 40,400	11/68	30	1	31	X
	Spectra 70/55	5	$ 38,400	11/68	6	-	6	X
	Spectra 70/60	6	$ 44,500	9/70	18	-	18	X
	Spectra 70/61	6	$ 50,000	3/71	9	-	9	X
	Spectra 1600	3	$ 3,800	1/69	63	-	63	X
	Spectra 70/2	4	$ 12,600	7/71	85	-	85	X
	Spectra 70/3	4	$ 20,400	10/71	19	-	19	X
	Spectra 70/6	6	$ 32,200	10/71	45	2	47	X
	Spectra 70/7	6	$ 39,900	10/71	21	-	21	X
	Subtotal				741	26	767	X
	Total Sperry Univac				4,845	3,884	8,729	895
Xerox	Sigma-5	4	$ 12,650	8/67	245	55	300	X
	Sigma-6	4	$ 20,000	11/70	38	8	46	X
	Sigma-7	5	$ 24,700	12/66	85	20	105	X
	Sigma-8	4	$ 19,000	9/71	15	10	25	X
	Sigma-9	6	$ 44,000	11/71	50	21	71	X
	530	3	$ 3,500	8/73	250	60	310	40
	550	3	$ 7,525	11/74	50	15	65	20
	560	4	$ 17,030	11/74	25	3	28	5
	940	5	$ 24,000	4/66	50	4	54	X
	9300	3	$ 8,500	11/64	18	4	22	X
	Subtotal				826	200	1,026	65
TOTAL					71,902	50,758	122,660	19,003

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• THE U.S. CHALKED UP A FAVORABLE BALANCE OF TRADE IN COMPUTERS, says the Department of Commerce. While business machines as a whole dropped 4.1% to a balance of $1.7 billion for 1975, computers and related equipment (84% of U.S. business machines exports in 1975) stayed steady with a balance of $2.1 billion. Exports of computers and related gear reached $2.2 billion; imports $128 million. Canada, with $320 million of U.S. exports, was the principle customer. West Germany followed with $274 million; the U.K. with $270 million, France with $223 million, and Japan with $189 million. Eastern Bloc nations imported $39.4 million. Caution is advised, however: DOC figures cover only that equipment manufactured in the U.S. by U.S. firms . . . many also manufacture equipment in other countries.

• SPERRY UNIVAC IS HOPPING ON THE DISTRIBUTED PROCESSING BANDWAGON with a new, currently three-membered family of intelligent terminals. First on the list is the 36 KB programmable UTS 400. These terminals can be clustered in various ways and are compatible with Sperry's Uniscope 100 and 200 terminals; various peripherals, including cassettes, diskettes, printers and multiplexors are available. The rental prices range from $273 a month for a one-station setup to $938 for a six station net. A special-purpose version called the UTS 400 Text Editor was also Meant for use by printers and publishers, it comes with specially microcoded ROM chips and 8K to 16K of RAM.

The third member of the family is the UTS 700 intelligent remote-batch terminal. Using LSI and MOS semiconductor technology, the disk-based UTS 700 features concurrent remote-batch terminal emulation and batch operation, disk file maintenance, system control language, and error logging. An RPG compiler and various utility programs are available as well. The UTS 700 is bus-oriented, comes with 65 KB of directly-addressable main memory, diskette (both single and double density) storage, cartridge disk capability, and the capacity for attachment to various readers, printers, and CRTs. A typical monthly rental price for a UTS 700 is $1709, purchase price $59K.

• IN TIME FOR MOTHERS DAY, a Virginia appeals court last week blocked the FCC's registration program for interconnect devices which would have allowed for the interfacing of computer terminal equipment (and eventually private PBXs) into the Bell system without the use of protective devices. The twelfth-hour stay gives AT&T a breather in its efforts to parry FCC rulings -- starting with the Carterfone decision in 1968 -- aimed at increasing competition in the communications marketplace. AT&T is currently lobbying in Congress for new laws that would diminish the effect of the FCC's Carterfone and Specialized Carrier decisions . . . much to the detriment (perhaps even dissolution) of the likes of MCI, Datran, etc.

• ON THE HAPPY SIDE OF DATACOMM, Intertel says it has a "network control system" that can test and restore communications networks on-line. Key to the NCS4000, as it is called, says the modem maker, is an ability to pass test signals around hub sites -- where multiplexors, concentrators and such prevent analog signals from reaching a test site. Thus diagnostics can be run without shutting down the line. NCS4000s, available this month, will cost between $50,000 and $100,000.

• FIRST QUARTER RESULTS OVER FIRST QUARTER 1975: IBM revenues up 17%, earnings up 26%; Honeywell revenues up 5%, earnings up eleven-fold; Sperry revenue up 9% (5% for FY; 11% computers only), earnings up 12% (16% for FY); Burroughs revenue up 11%, earnings up 4%; NCR revenues down 2%, earnings down 37%; DEC revenues up 42%, earnings up 67%. Many of the earnings statements were affected by changes in accounting standards adopted in 1975; revenues were not affected.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MAY 13, 1976 • VOL.11,NO.20 P.J.McGOVERN,PUBLISHER

NCR DEBUTS ITS CENTURY SUCCESSOR: 'CRITERION'
ECL CIRCUITRY, BUS STRUCTURE, VIRTUAL STORAGE FEATURED

Laying to rest user fears that NCR would edge its way out of the mainframe industry to concentrate on its autotransaction strengths, the Dayton mainframer last month introduced two models of its Century follow-up . . . a family dubbed "Criterion" by no less than William S. Anderson, president and chairman of NCR.

The new systems range in performance, says NCR, from the Century 200 to beyond the Century 300 -- allegedly offering 35% more power at less cost than competing systems such as the IBM 370/115 through 135. And NCR promises that other Criterion models -- both smaller and larger -- are yet to come. All will be totally compatible with the existing Century line.

Behind NCR's renewed commitment to mainframes -- lodged for the moment in Criterion models 8550 and 8570 -- lies some interesting technology:

- Emitter-coupled logic. Such circuitry provides superfast CPU cycle times and smaller space and power requirements (a mainframe in 10 sq. ft.; cycle times faster than comparable 370s by orders of magnitude).

- Bus structure. Similar to many minicomputers, the Criterion's various processing elements -- CPU, memory, peripheral and communications controllers, etc. -- are connected via a fast internal transfer bus.

- Extensive use of firmware. Microcode, read from diskette into an "instruction storage unit" (ISU), enables the computer to assume different personalities -- which, in turn, allow the machine to assume Century "identity" or optimize the compilation of application programs.

For NCR, which just last year phased out the last of its mechanical production, Criterion technology offers compatibility with the future as well as the past. Indeed, though NCR would neither confirm nor deny it, the Criterion -- or at least its architecture -- is a likely bridge to the "swing" processor and/or operating system CDC and NCR have been jointly developing since the early 1970s (EDP/IR,July 18,1974). The bus structure, for instance, seems amenable to multiprocessing, the firmware usage to software or operating system changes.

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Meanwhile, against this backdrop of future adaptability, Century users have an easy-to-negotiate upgrade path available to them.

Criterion criteria

Two operating systems will be available for the Criterion. The first is a real storage system supporting Cobol, RPG, Fortran, and NCR's NEAT 3 and providing Century emulation. The second -- not available until mid-1977 -- is a "virtual resources executive" (VRX) providing virtual storage operation (16 MB per program) and turning the Criterion into what NCR calls a "virtual machine."

Under VRX, microcode (firmware) in the computer's ISU is grouped in tailored sets of microprograms which execute applications software in object (machine) commands -- and create the so-called "virtual machines." Each firmware set is designed for optimum execution of its associated language or application on the Criterion . . . and multiple sets can exist in the computer at once. Firmware sets announced with the Criterion include a Cobol 74 compiler, network definition language, NEAT/VS, and some utilities. In addition, VRX provides Century simulation.

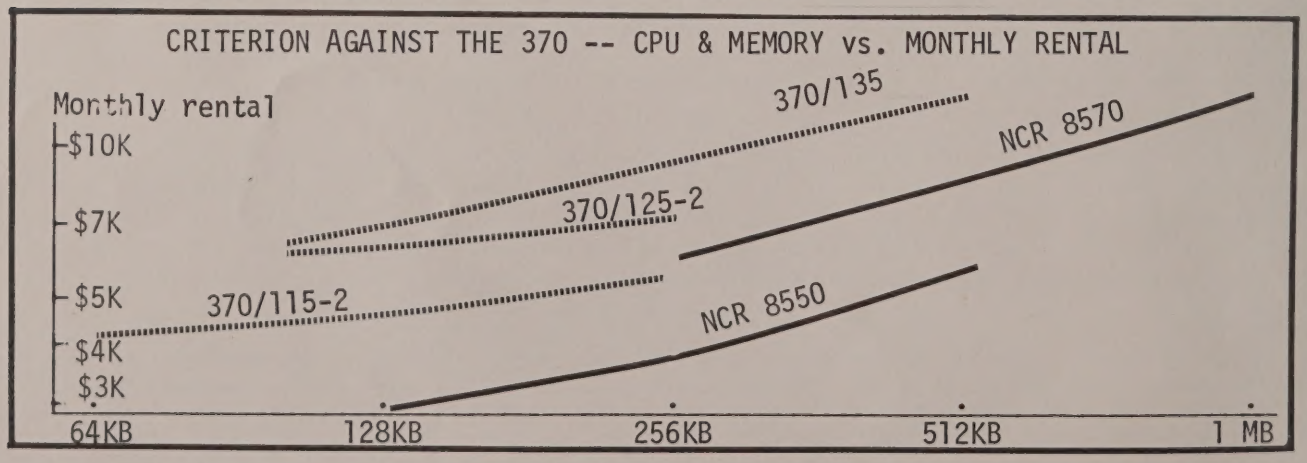
NCR seems especially excited about what VRX does to Cobol 74. Preliminary tests, says the company, show object programs compiled on a Criterion with 25% to 30% fewer instructions than those processed on traditional compilers from the same coding. Furthermore, says NCR, the Criterion executes its high-level object programs with 70%-75% fewer memory accesses . . . meaning faster run times.

On the hardware side, the 8550 and 8570 include:

- 8550: 128 KB to 512 KB semiconductor memory, an 8 KB ISU, up to one integrated disk controller (8 spindles) and 10 communications lines. The minimum rental price is $2,900/month, but a basic usable configuration is twice that ($260K to purchase).

- 8570: 256 KB to 1 MB memory, a 10 KB ISU, up to 2 disk controllers (with up to 3 strings of up to 8 spindles each) and 10 communications lines. The minimum rental price is $6,900/month, basic usable configuration $10K/month ($460K purchase).

- For both models, the VRX ISU is 24 KB, with another 24 KB housed in regular main memory. Also, both systems can utilize the NCR 6590 "Winchester" type disk system (35 MB or 70 MB capacity); both have extensive diagnostic routines, including remote diagnostics capability.



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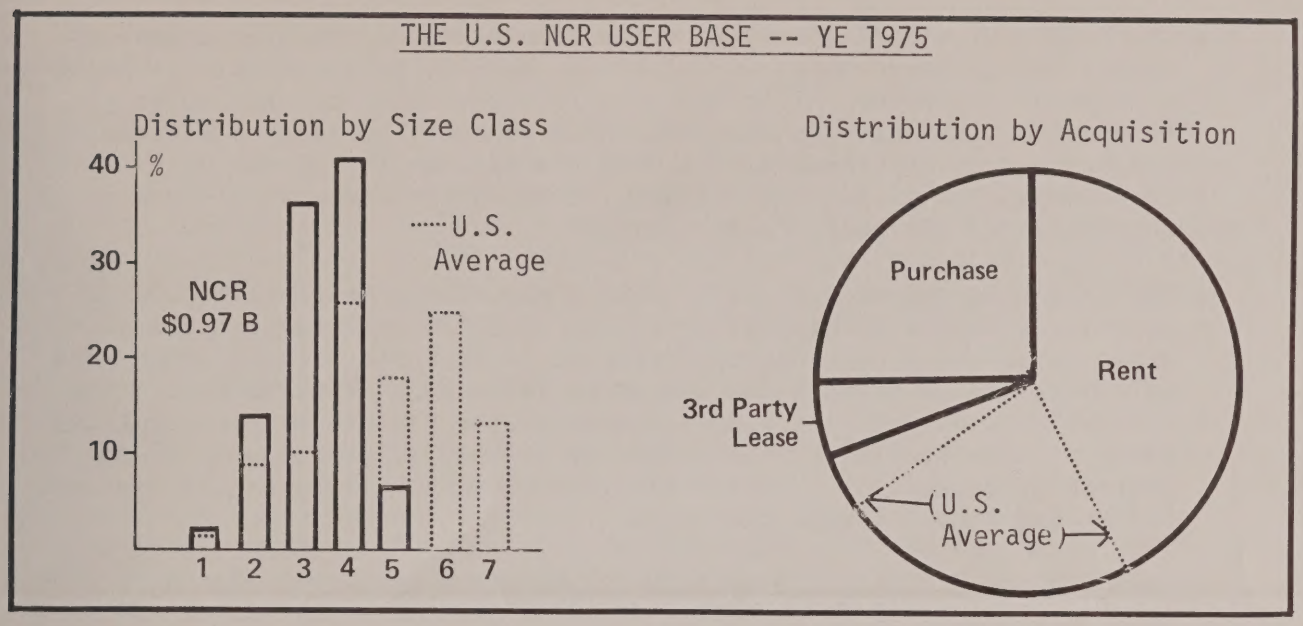

Marketing the Criterion

NCR's first target for the Criterion will be its current Century base (depicted above) -- hence the emphasis on compatibility, hence the bundling of Century emulation. But while Criterions may run as Centuries -- and even do a better job on Century-native software -- it's not their optimal utilization. The phased introduction of Criterion operating systems should help users make the transition.

In additon, NCR admits it's eyeing other mainframe bases. In fact, for what larger-scale Criterion models are yet to come that may be the main target (could CDC get involved here?). But if IBM introduces new mid-range 370s any time soon -- as some observers are predicting -- then the Criterion's prospects among 370 users will undoubtedly dim a bit.

Interestingly, NCR also launched into unbundling with Criterion . . . pricing all software except for the basic real storage operating system separately. (The Cobol 74 VRX compiler, for instance, is available for $90 a month; some utilities cost as low as $10 a month.) The company will also unbundle Century products.

And while, as NCR says, unbundling prevents users from supporting development of software they won't need . . . the concept itself seems to fit the architecture of the new system . . . paralleling from a marketing point of view Criterion's modularity and adaptability to the future.

COMPETITION IN SMALL BUSINESS COMPUTERS HEATS UP
AS BURROUGHS ANNOUNCES ITS NEW $20,000 COMPUTER -- THE B 80

While NCR was revamping the upper end of its product line, another mainframer was working at the small end of things. Calling it the B 80 and aiming it at first time computer users and large corporations getting into distributed processing, Burroughs introduced a $20,000 small business system. Borrowing both hardware and software technology from much bigger Burroughs systems, the B 80 bridges the gap between the company's L series accounting machines and 700 series computers.

Two major technological advances promise to make the B 80 a formidable competitor in the heated race for small business computer dollars:

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- The B 80 CPU, a 1 MHz processor, has been squeezed via LSI technology onto a 9-chip board which includes nano memory, micro stack, I/O logic and system registers. It's necessarily sophisticated, says Burroughs, to provide simplicity in its use. When pressed, Burroughs' Chairman Ray W. Macdonald pointed to the 9-chip design as its single most impressive new technological feature. The CPU has already seen use in Burroughs' AE 501 Audit Entry Terminal.

- The operating system for the B 80 is a powerful subset of the operating system used with higher-level "700" and "800" series computers. Also called the Master Control Program, it supports virtual memory and multiprogramming through the use of variable sets of microcode. (The MCP calls in only the microcode needed at the time to process applications or interpret high-level software -- thus allocating system resources dynamically.) The MCP gives the B 80 many of the features and functions of much larger machines.

Along with the B 80, Burroughs also introduced a new double-density, double-sided flexible diskette (1 MB capacity, 266 milliseconds access time) and a new 180 cps matrix printer. Semiconductor main memory on the system runs from 32 KB to 61 KB, and prices for the hardware run from $20,000 to $150,000.

The software key

When Burroughs announced the B 80 it also announced what it calls the "Computer Management System (CMS)" . . . essentially an integrated grouping of all the B 80 software -- including the MCP, higher level language compilers, microprogram sets (interpreters), utility programs, and application programs. The latter -- called Business Management System (BMS) program products by Burroughs -- were previously available with B 1700, B 700, and L series systems.

CMS, in fact, may be the real key to B 80 acceptance . . . for it makes the B 80 compatible (with recompiling) with current products and (without recompiling) with "800" systems yet to come. Therefore, large companies with decentralized operations and a Burroughs mainframe are one of Burroughs' main marketing targets.

Another target will be the vast L series base -- and both L series and B 700 sales should be affected by the B 80. (Both will continue to be made, however, since upgrading users may wish to stay with a card-based system.) And, the company points out, as L users upgrade, Burroughs' statistical market share may change drastically -- for L systems are generally counted as accounting machines and not computers. Thus, the B 80 brings yet another stratum of users to computing.

Gauging the field

The B 80 joins a highly competitive field -- paced, of course, by IBM's S/32. Between now and the end of 1980, says IDC in a recent study of the small business computer market, the installed base of small business systems in the U.S. is expected to grow at an average annual rate of 20% . . . from just over $3 billion at yearend 1975 to over $7.5 billion at yearend 1980. The portion of that base attributable to non-IBM mainframers will approach $2 billion by then.

Though the definition of "small business computer" is often hazy, for the purposes of the study and the numbers and charts presented here, the list of models on page 5 can be considered the "universe" of small business computers.

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The major suppliers of small business systems fall into four recognizable categories. They are:

- IBM. With over two thirds of the installed base, IBM is the single most powerful force on the market. IBM System/3 and 32 users cite the company's service and support as their major reason for acquisition -- and examine other vendors' offerings to a much lesser extent than other small system users. IDC's forecast for IBM's market share and installed base growth does not factor in a System/32 replacement since IBM small business systems have typically had a product life of five years or so.

- Other mainframers. These companies can also wield large service and support organizations . . . and outfits like NCR and Burroughs have a ready-made pool of prospects in their large accounting machine bases. The biggest unknown is Univac -- which is competing with relatively old 9200s and 9300s. In cases where users considered more than one supplier when they acquired their system, one of the competing vendors was a non-IBM mainframer 55% of the time.

- Independents. The two major companies in this bracket are Singer and Basic/Four. Others include Wang, Cascade Data, Qantel, and Anderson-Jacobson. Growth in the independents' share of the installed base has been dampened by Singer's withdrawal from the business.

- Minicomputer vendors. Here, the traditional "iron-selling" makers of minicomputers have found ways -- primarily through systems houses and distributorships -- to wrap their systems in enough software and applications packages to turn them into small business systems. For users buying minicomputer small business computers, price/performance is the one overriding factor affecting acquisition.

U.S. SMALL BUSINESS COMPUTER MARKET: INSTALLED BASE 12/75

Supplier	Model	# Installed	$ M	% ($) Share
IBM	S/32	5,000	180	5.7%
	S/3-6	2,750	186	5.9
	S/3-8	1,200	101	3.2
	S/3-10	16,700	1,675	53.5
		25,650	2,142	68.3
Singer	System 10	1,950	212	6.8
Univac	9200/9300	1,750	252	8.0
DEC	Data Sys 300, 500	1,500	75	2.4
NCR	Cen. 50, 8200	1,245	123	3.9
Burroughs	B 7XX, 1712/14/18	1,200	113	3.6
Basic/Four	350, 400, 500	1,000	50	1.6
Honeywell	G-5X, 61/58, 60	775	63	2.0
Wang	WCS 20, 30	600	21	0.7
Qantel	800, 900/1100, 1200	400	14	0.4
Lockheed	System III	300	15	0.5
Microdata	Reality	200	10	0.3
Others		1,030	41	1.5
TOTAL		37,600	3,131	100.0

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In addition, small business systems are available from overseas sources like ICL, Nixdorf, and Philips. Also, although not considered small business computers for the purpose of this study, such distributed processing systems as the Data General "Eclipse" and Four-Phase IV-40 and 70 can be used in small business applications. So too, at times, can larger general-purpose (Group A) computers.

DP at small business

Small companies with data processing needs (primarily accounting-related) have various alternatives for filling those needs . . . and makers of small business computers must contend with them. These alternatives run the gamut of sophistication from "manual" to full-scale general-purpose mainframe use.

Among the U.S. companies with sales less than $25 million -- likely buyers of small business computers -- IDC found that:

- Almost twice as many companies of this size do not utilize an in-house computer as those who do.
- Of the noncomputer users, about 40% use an outside service bureau, 30% use only manual methods, another 20% use accounting machines.
- Of the computer users, over 60% use just a computer, while 25% use a computer and a service bureau. The balance use computers and other equipment such as accounting machines.

In analyzing the processing methods displaced by small business computers, IDC found them supplanting either manual methods or accounting machine three times out of four. Almost a fifth, however, replaced service bureau usage; and very few replaced another computer system. The breakdown looks like this:

Processing Methods Displaced -- Present Applications

	Manual	Acc. Mach.	Ser. Bur.	Computer
IBM System/32	54%	19%	19%	8%
System/3	43	35	18	4
Other Mainframe	35	42	19	4
Minicomputers	29	35	24	12
Independents	42	27	21	10
TOTAL	42%	34%	18%	5%

In new applications current small business computer users plan for the future, the displacement picture is different. Two thirds of all future applications will displace manual methods; only 7% will affect accounting machines (probably because the accounting machine was displaced by the on-hand system). Next to manual methods, service bureaus will see the most displacement (13%) by future applications. In 10% of the cases, no previous methods will be displaced.

The growth of the U.S. base of small business systems -- by supplier type -- is shown opposite. Dollar forecasts are presented using an average system value technique applied to all systems within a supplier category and which is allowed to increase or decrease over time depending on the expected interaction of new system shipments and enhancements to the installed base of older systems.

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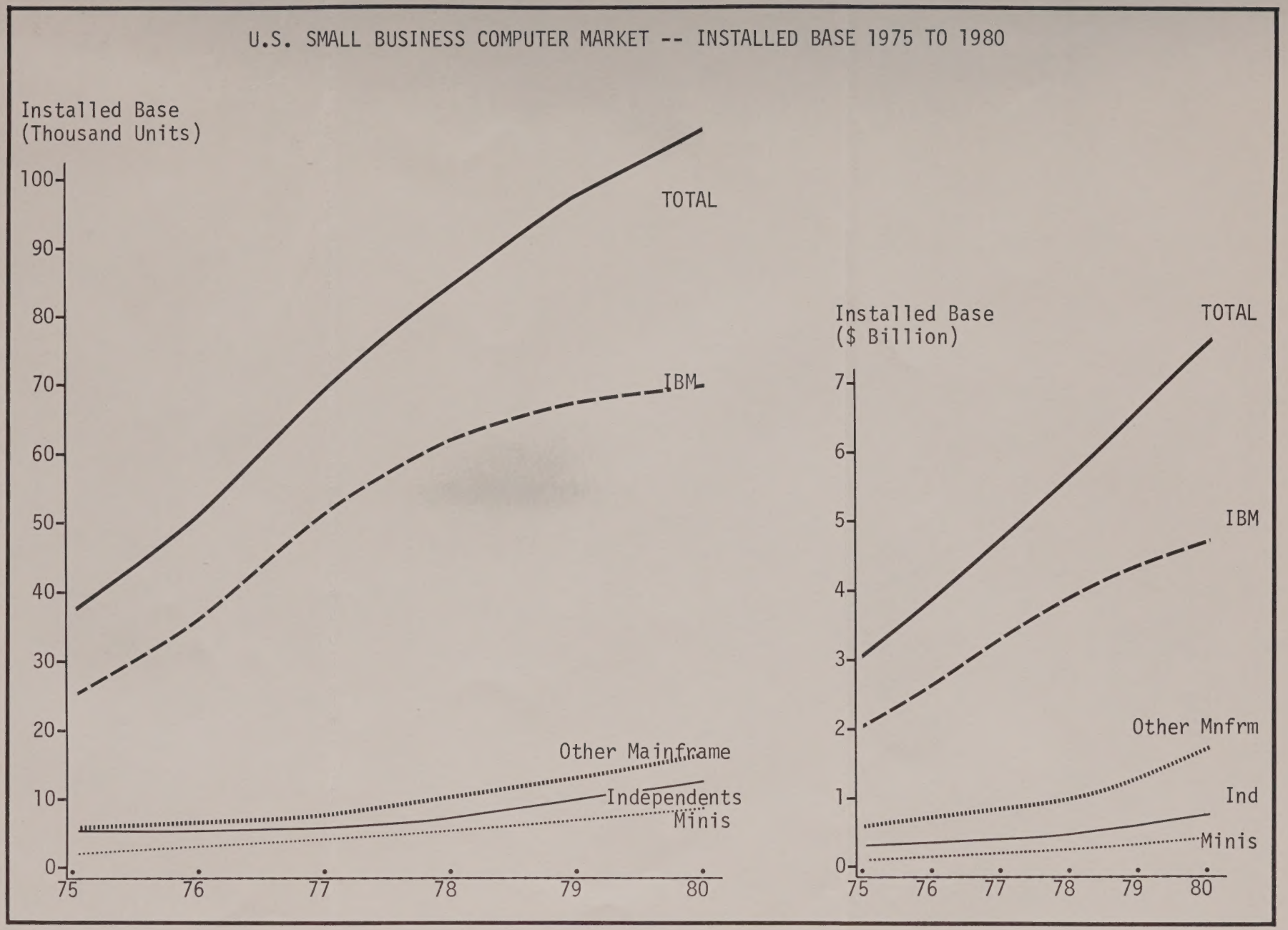

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• PACKING 8 MEGABYTES INTO A SINGLE CABINET, CDC now offers add-on and replacement memory for IBM 370/168s and 158s. The new memory products use 4 KB semiconductor modules and come with off-line diagnostic capability and maintenance display panel. The 168 memory comes in 1- to 7-megabyte increments at prices 38% to 53% below IBM's, says CDC; the 158 memory can be done in ½- to 7½-megabyte increments at prices reportedly 28% to 58% lower than IBM's. The 168 memory costs from $163,000 for 1 megabyte to $895,000 for 7 megabytes or $4,405 to $24,175 per month on a three-year lease. The 158 memory runs from $94,000 to $845,000 purchased or $2,350 to $22,820 per month on a three-year lease.

• NOW COMPARE THAT WITH INTEL's NEW 168 MEMORY, to be released this month. The in-7168, as it is called, also stores 1 to 8 megabytes in a standalone frame and also comes with a maintenance panel. Intel claims the in-7168 saves up to 30% on IBM lease costs and that the first production unit is up and working at the Government Employees Insurance Company in Washington, D.C.

• GUNNING FOR THE 370 DISK STORAGE MARKET, Memorex has announced a "Winchester" type drive, the Memorex 3640. The disk system, says the company, is fully equivalent to the IBM 3340. Memorex has been shipping movable head "Winchester" type data modules for over a year and fixed head versions for several months. With the 3640, the company can now supply users the whole disk system package.

• ITT WANTS IN ON U.S. DATA COMMUNICATIONS . . . and has filed a plan with the FCC to provide a coast-to-coast switched common carrier network. Planned to begin operation by 1978, the ITT service would provide two major offerings initially: 1) a switched, private network service, and 2) a "corporate communications switching equipment offering." The cost of the initial system, says ITT, will be $29 million over seven years and will cover seven switching centers and ten tariffed extension cities.

The heart of the new ITT system will be the switch center, composed of two technologically discrete parts -- the switching computer and the modular switch matrices. (The switching computer is designed to provide network management controls of line and trunk equipment and will be able to access lines and/or trunk interconnections between switching centers and the customer's premises.)

Users of the ITT switched private network service (SPNS) will pay a monthly service charge, a one-time installation charge, and a distance-dependent use charge. Users of the corporate communications switching equipment (CCSE) service would pay a one-time installation charge and a per port charge to use the ITT gear. Actual rates, however, are yet to be determined.

• NEW MAINFRAME OFFERINGS IN EUROPE: ICL, the U.K.'s leading mainframer and U.S. market hopeful, has announced a mid-range model of its "New Range" 2900 series of "virtual machines." The ½ to 3 MB system can be singly or dually configured and is microprogammed to emulate its ICL predecessors, the 1900 and System 4. A typical 2960, as the new system is labeled, sells for £600 (about $1.1 million) as a uniprocessor, twice that for a multiprocessor. ICL is the company that pioneered the concept of virtual storage.

Philips, the Dutch member of ill-fated Unidata, hopes to bridge the gap for users migrating from the "transaction processsing of electronic bookkeeping" to batch use of business computers with its new disk-based P410. The system -- apparently a hybrid of Philips office computers and small business machines -- comes with 16-64 KB of core memory.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MAY 28, 1976 • VOL.11,NO.21 P.J.McGOVERN,PUBLISHER

Bell bullying Congress? Page 3

IBM SLASHES SEMICONDUCTOR MEMORY PURCHASE PRICES 35 PERCENT MOVE COUNTERS INDEPENDENTS AND AMDAHL, HAS WIDESPREAD RAMIFICATIONS

Weeks shy of the fifth anniversary of its fixed-term lease plan (EDP/IR, June 2, 1971) IBM announced a major price cut on main memory. At the time of announcement FTP was interpreted as a direct reaction to the success of independent plug-to-plug peripheral equipment makers. It also factored heavily in the Telex case.

Last week's purchase price reductions involved several products. Most significant, however, was the price of Mosfet (semiconductor) memory -- the type used in the 370/115, 125, 158, and 168 as well as GSD's System/32 and System/3, Models 8, 12, and 15. The price was slashed from 23¢ a byte to 17¢ a byte, a 35 percent reduction for this component of IBM's major systems.

With this action, IBM gets about as much mileage as would seem possible. In one fell swoop, the price cut gives:

- Proof that technology continues to advance and the customer continues to benefit. The announcement said: "The decreases reflect cost reductions including improved manufacturing techniques."

- A reaction to the independent memory suppliers. They are currently mounting a strong attack on IBM's base, and IBM certainly doesn't want to see a repetition of the high (almost half the bytes installed in the U.S.) independent replacement of core memory.

- Additional pressure on other mainframers. The system price effect of the cheaper semiconductor memory is in the 4-5 percent range, according to the company.

- Another weapon in the anti-Amdahl arsenal. With the new pricing, IBM can now say this to users shopping in the larger-memory 158 and 168 categories: "Here's a multiprocessor for the same or a little less than you could have paid for a uniprocessor last week."

- One more tributary to the corporation's steadily increasing stream of purchase dollars.

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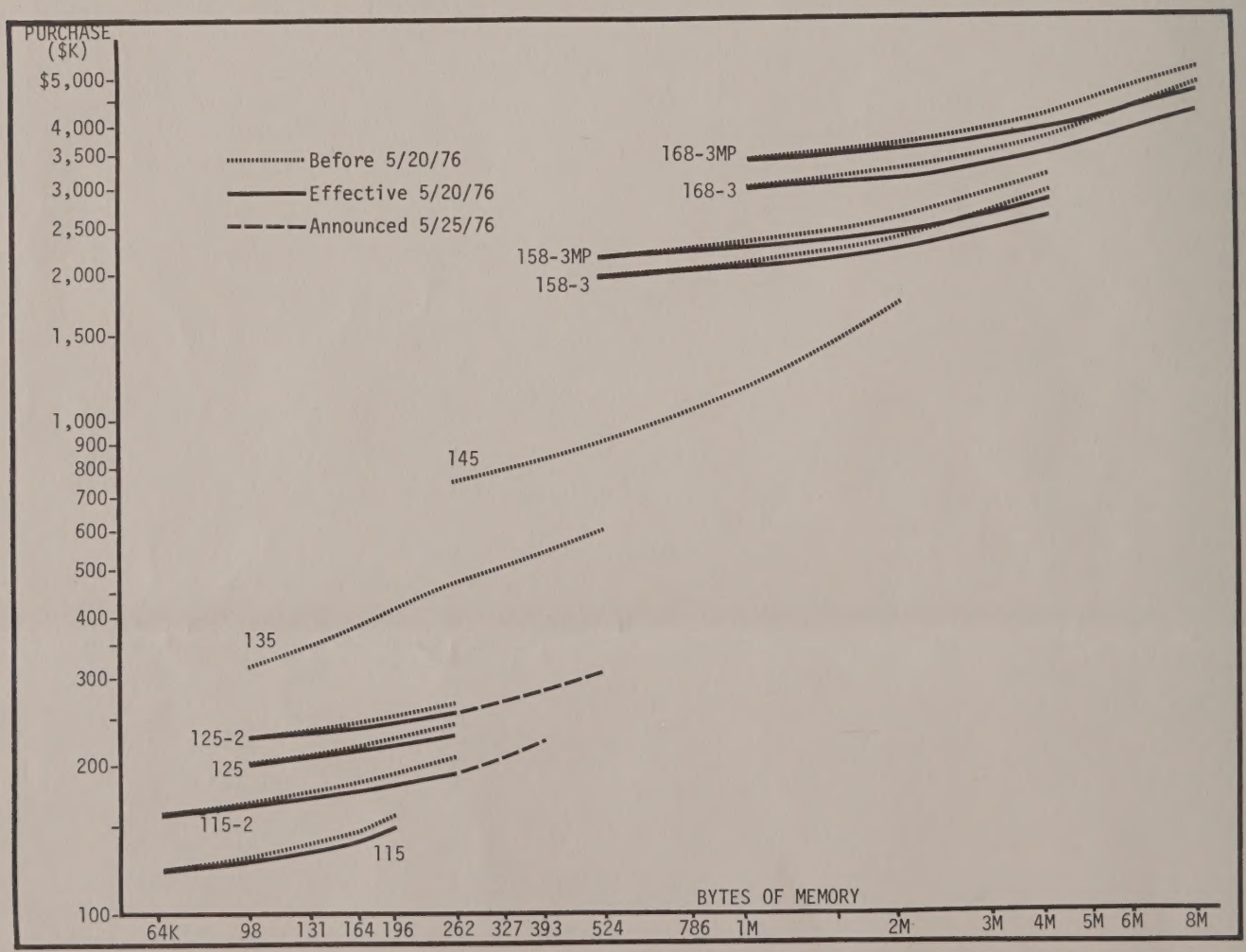
Indeed, when IBM -- just days after the price cut -- announced that it had "significantly expanded" main memory for 115-2s and 125-2s, a changing pattern seemed to be shaping up (graph, below). The question: Will IBM continue to neglect the middle of the line? Or can new models (or enhancements) be expected soon?

At any rate, IBM's actions seem to have set some additional guidelines under which the mainframe portion of the industry will operate for awhile. As this issue of EDP/IR was going to press, we received Amdahl's announcement of new prices that reflect "reductions in memory prices of approximately 38%." And we would expect, momentarily, similar price action from the independents.

In the U.S. today, independent suppliers account for over 35% of the memory installed on 360s and a whopping 56% of the main memory on 370/155s and 165s. At yearend 1975, however, they accounted for only 5% of the memory on VS 370s . . . significant since this base of 4,400 megabytes is more than double the amount of core on 360s and the original 370/155s and 165s combined. IDC studies show that users plan to increase this capacity by almost 60% by the end of 1977. And semiconductor memory market leaders AMS and Cambridge, as well as others such as Intel and National Semiconductor, are working to obtain a much larger share -- up to 50% -- of the addition. So an additional reason for IBM's action is clear.



PURCHASE PRICES FOR CPU AND MEMORY hint at IBM strategy. At low end of 370 line, memory price is lower and capacity is increased. At top end, lower memory price means cost of multiprocessor now is same or lower than large uniprocessors were

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Misnomer?

BELL SYSTEM SQUARES OFF AGAINST THE FCC ON CAPITOL HILL "CONSUMER COMMUNICATIONS REFORM ACT OF 1976" INTRODUCED

In the post-Carterfone years since 1968, AT&T has watched its monopolistic authority over the telecommunications industry fray at the edges. An FCC ruling here, a court decision there . . . and the cloak of custom which has kept the Bell System synonymous with telecommunications has slowly eroded.

At each step the company has fought back, generally at the judicial or regulatory level. But following the DOJ's antitrust filing in late 1974, Ma Bell went public. Stockholders, users, press -- anyone who would listen -- could regularly hear AT&T Chairman John deButts decry from various podiums around the nation these inroads into Bell's American way of life.

With that public campaign as prelude, AT&T has now taken its case to Congress . . . with the "Consumer Communications Reform Act of 1976," introduced in the House by Rep. Teno Roncalio (D-WY) on March 4. The bill's stated purpose is to reaffirm the intentions of Congress when it passed the Communications Act of 1934, which enfranchised the Bell monopoly.

(A Senate version was introduced on March 23 by Sen. Hartke of Indiana; since then no less than 83 similar bills have been introduced by over 125 sponsors!)

But despite its "consumer" label, argue opponents of the bill, the 1976 act -- in one of its full-fledged versions -- would actually harm consumer interests by stifling competition. It would:

- Throttle FCC power over AT&T pricing by allowing the lower rate limit for a carrier service to reflect only "incremental" costs -- or the additional cost to the carrier that providing such a service entails. Overhead for new services is thus subsidized by older offerings.

- Promote a hodgepodge of tariff regulations over terminal and station equipment interconnecting with the telephone system by rendering tariff control to overworked, understaffed (AT&T-malleable?) state utility commissions . . . reversing FCC policy and court rulings.

- Eradicate the specialized common carrier market by letting the FCC license only those specialized services that don't duplicate currently offered -- or possible to offer -- services of the common carrier.

Though no one expects Congress to act on the bill this session . . . the blitz, says Rep. Lionel Van Deerlin (D-CA), Chairman of the House Subcommittee on Communications, is sufficient to warrant hearings on the matter this year. AT&T's fire, it would seem, is well-lit.

The opposition lineup

Though AT&T was noticed scurrying about the Hill long before any bills were actually introduced, the opposition has been slow in organizing. And given Bell's monopoly on Congressional ears, the voting power of AT&T shareholders and workers, and a solon's ingrained habit of jumping on bandwagons . . . the bill's early support may not be too surprising.

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Aligned against the bill are these groups from industry:

- The Ad Hoc Committee for Competitive Communications -- formed last week specifically to combat the AT&T lobby. It consists primarily of specialized carriers like Datran, MCI, etc. -- but will receive financial support from outsiders like Telenet and IBM-Comsat's SBS.

- The North American Telephone Association (NATA) -- an association of over 200 nationwide contractors, manufacturers, and suppliers of terminal telephone equipment. NATA (and the FCC) won against the North Carolina Utilities Commission in the "Telerent" case, where the state had attempted to prohibit independent interconnection to the network.

- The Independent Data Communications Manufacturers Association -- a group of modem and multiplexor makers (ICC-Milgo, Codex, Intertel, et al).

Other organizations and companies are still evaluating their positions or most effective strategies. Meanwhile, those companies most affected -- the specialized common carriers and interconnect equipment firms -- have another worry. While the bill may not be passed soon -- or even ever -- its mere existence is a threat to their ability to raise capital.

Kevin Hannon, NATA's Executive Director admits: "If I were a banker and saw a bill that would wipe out an industry co-sponsored by a hundred congressmen and senators, and I didn't understand the machinations of Capitol Hill, I would be more than concerned about providing capital to any company involved in that industry."

In the long run, however, the most effective voice against the AT&T bill may be the government itself. Already the FCC is vehemently opposing the bill . . . and the DOJ, the White House's Office of Telecommunications Policy (OTP), several state utility commissions, and various court decisons have all at one time or another countered Bell's assertion that competition is bad for the consumer.

THE OTHER GIANT'S REACTION

IBM, as one-third owner of SBS, has a definite stake in matters of communications reform and would lend any AT&T opposition considerable clout. Though reluctant to make any strident statements, the company did say this to EDP/IR:

"IBM believes that competition in the terminal attachment and specialized communications services areas is essential to technological advance and to expanding benefits to consumers. At the same time we recognize the importance of a viable telephone network to provide the basic facilities for public use. In our judgment, legislation would be premature on these very important and complex public policy issues. We would be concerned to see the responsibility for regulation of terminal attachments placed in the states rather than the FCC. This could lead to conflicting and restrictive rules and standards which would prove burdensome to the many manufacturers and users of telecommunications products with resultant higher costs to the consumer.

"We support the responsible way in which the FCC has dealt with the issues to date. Certainly ample time must be taken by the Congress to carefully review the FCC actions and to make its own thorough investigation and analysis to be certain that the policies adopted are in the best long-term interest of the nation." -- May 28, 1976

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Disputed statistics

At the heart of the bill lies the contention that competiton in specialized areas -- in that it reduces the common carrier's revenues overall -- will cause rates for basic phone service to go up. The premise is that the lucrative specialized services help the phone companies subsidize their less profitable offerings . . . like residential phone service.

(In the extreme case of competitors depriving the phone companies of all contribution to common costs of their discretionary services, deButts has stated publicly, the average resident's bill for basic services would skyrocket 75%.)

But that basic premise is contested. The New York State Public Service Commission recently ruled, for instance, that New York Tel's residential rates were, in fact, subsidizing terminal equipment tariffs -- to the tune of $225 million a year -- and price hikes of 25% in this category were ordered. And a preliminary study by the FCC's Common Carrier Bureau, forwarded to Congress on May 25, also suggests that the cross-subsidization of basic services by special services may actually be the other way around. (In this case, competition -- to the extent it takes revenue from a lower-than-cost telephone company service -- actually benefits the residential consumer.)

TELECOMMUNICATIONS INDUSTRY STATISTICS FOR 1975
(Source: FCC Common Carrier Bureau Preliminary Study)

	1975 Revenues In $ Million	% Total Industry	Increase 1974-5 ($M)	(%)
TELEPHONE INDUSTRY				
Local Exchange	$13,832	39.2%	$1,223	10%
Interstate MTS/WATS	9,176	26.0	1,074	13
Intrastate " & Private Ln	6,868	19.5	854	14
Misc. Revenues	1,138	3.2	92	9
Total Monopoly Services	31,015	87.9	3,243	12
PBX and KTS	3,060	8.7	296	11
Interstate Private Ln	1,017	2.9	77	8
Total Competitive Services	4,077	11.6	373	10
Total Telephone Industry	35,091	99.5	3,616	11
COMPETITIVE INDUSTRY				
Interconnect (PBX and KTS)	143	0.4	36	37
Specialized Carrier	27	0.1	20	285
Satellite Carrier	16	neg	16	-
Total	186	0.5	72	63
Bell System	25,591	83.9	2,830	12
Independent Telcos	5,500	15.6	786	17
Competitive Industries	186	0.5	72	63
Total Industry	35,277	100.0%	3,688	12%

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THE CONSUMER COMMUNICATIONS REFORM ACT OF 1976

Editing the legalese from the several versions of the bill is no mean feat. But as we see it -- and we've chosen to boil down the original Roncalio version -- the crux of the measure is as follows:

A Bill

"To reaffirm the intent of Congress with respect to the structure of the common carrier telecommunications industry rendering services in interstate and foreign commerce; to reaffirm the authority of the States to regulate terminal and station equipment used for telephone exchange service; to require the Federal Communications Commission to make certain findings in connection with Commission actions authorizing specialized carriers; and for other purposes."

I. Findings and Declaration of Purpose -- the act's basic premises:

A. Revenues from interstate and foreign services contribute to the common costs of local service and help "maintain a level of charges for telephone exchange service which is lower than would otherwise be required."

B. Network integrity is vital, and Congress reaffirms its policy that the system be structured to maintain that integrity.

C. Offerings of specialized carriers which duplicate those of common carriers: 1) raises costs for local telephone service, 2) fosters inefficiencies in the use of telecommunications resources, 3) impairs the integrity of the network, and 4) has an adverse affect on the nation's economy. It's therefore contrary to the public interest.

D. Congress reaffirms its intent that authority to regulate terminal and station equipment used for local exchange service rests with the States.

E. The FCC shall take no action contrary to the findings of this act.

II. Charges for Service -- the FCC is enjoined from holding the charge of a carrier to a level set to protect services offered by another carrier provided the charge proposed is "compensatory." A charge is compensatory when it equals or exceeds the incremental cost of providing the proposed service.

III. Acquisitions by and of Certain Common Carriers -- gives the FCC jurisdiction to approve acquisitions and mergers of domestic common carriers.

IV. Reaffirmation of State Jurisdiction -- and intrastate equipment and services include those that are also used for interstate communications.

V. Commission Authorization of Specialized Carriers -- the FCC is enjoined from licensing specialized carriers if:

- Doing so will raise local exchange rates, duplicate common carrier facilities or service, or impair the national network.
- The proposed service is similar to any provided by a telephone or telegraph common carrier or can be provided by available communications lines, or equipment of one. The burden of proof rests with the applicant.

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In its preliminary study the FCC points out:

- In a telecommunications market which produced $35.3 billion in 1975 revenues, the telephone industry accounted for $35.1 billion, or 99.5% (see chart, page 5). The competitive industry made up the difference with $186 million.

- Considering only the private line and terminal equipment submarkets -- the only areas open to competition -- the telephone industry received $4.1 billion, or 97% compared to that rival $186 million.

- Annual revenues for the telephone industry's "competitive" services are increasing at a faster rate (14.2% per year) than before the Carterfone decision (13.8%). In addition, the telephone industry's market share in the competitive services is increasing year by year.

- During 1975 the Bell System's return on equity was 9.8%; for the independent telephone companies it was 9.0%. This compares with a return on investment for private line competitors (including domestic satellite carriers) of minus 15%.

- In light of the New York Public Service Commission's findings, if the same situation is occurring in other states, then other services may be contributing up to $2.25 billion annually to cover revenue deficiencies from the telephone industry's underpricing of terminal equipment alone (New York represents 10-12% of the total telcomm market).

As the figures cited by the FCC show, the specialized carriers currently represent but a gnat-sized threat to Ma Bell. The agency's full study is scheduled to be released next fall.

The politics of motherhood

As a result of such evidence and informed opinion counter to AT&T's contention that competition in special areas is not in the national interest, pundits variously see in the Act:

+ A last ditch effort by AT&T to extend its telephone exchange monopoly to services not envisioned when the 1934 Communications Act was passed.

+ A way of pressuring the FCC. With the agency under the gun from the legislature, it will be forced to act cautiously (pro-Bell). And because of AT&T's lobbying weight, a reduction of FCC powers and increase in Congress's would favor the carrier.

+ Through the acquisition section especially, an offhand immunity to antitrust action. And any arguments sufficient to convice Congress to pass the act would probably also convince it that the spinoff of Western Electric from AT&T would be disadvantageous to "consumers."

At any rate, many -- *including the editors of EDP Industry Report* -- view the Consumer Communications Reform Act as a misnomer. By spurning the technological advances competiton brings -- as post-Carterfone telecommunications events indicate it does -- it will, in fact, force consumers to pay in lost innovation. And pressuring an election-year legislature to pass it is contrary to the public weal.

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• TYMSHARE'S GOING LEGIT WITH PACKET-SWITCHING, having filed an application this month with the FCC for authority to operate its Tymnet network as an interstate common carrier. Previously, the timesharing company had offered its network under a provision of AT&T tariff 260 which allows users to jointly use a private network, but when competitor Telenet went on-line in August controversy arose over Tymshare's unregulated status. Tymshare, however, claims the reason for its application is to take advantage of new business opportunities in the expanding specialized communications area . . . not as a result of Telenet pressure or forecasted FCC action. Tymnet users, though, should be happy to see the controversy dissolved. All that's left to worry about now is that burr called a "Consumer Communications Reform Act of 1976" that's floating around the Hill . . . .

• THE IBM TRIAL CELEBRATED ITS "PAPER" ANNIVERSARY on May 19. After one calendar year, 133 days have been spent in court over a period of 35 weeks, 29 witnesses have taken the stand, 19,179 pages of trial transcripts have been recorded, and over 1,000 documents have been entered . . . yet the government has barely begun to present its case. "Paper" anniversary indeed.

Within the courtroom, Judge David N. Edelstein this week was particularly concerned about the contradictory testimony of Larry Welke of International Computer Programs, Inc., who discussed unbundling and the software industry. Welke's deposition and testimony on direct, cross, and redirect examination were all somewhat different. He was increasingly confused, angering the judge. Not represented by an attorney and perhaps the victim of poor witness preparation by the DOJ (or subtle IBM pressure, some believe), Welke could possibly be tried for perjury because of his changing testimony. If so, how many government witnesses will still be eager to appear at Foley Square?

• IBM IS UPPING THE MAIN MEMORY LIMIT FOR SYSTEM/370 Models 115-2 and 125-2 to 393 KB and 524 KB respectively. A topend Model 115 will rent for $6,600 monthly, sell for $220K, and be available the first quarter of 1977. A 125 with 393 KB will rent for $9,115 and sell for $303K with fourth quarter 1976 availability. This memory expansion comes in the wake of recent memory-related price reductions on semiconductor 370s (see page 1).

• HEWLETT-PACKARD'S FASTEST SELLING PRODUCT GOT A NEW LOOK LAST WEEK when the minimaker introduced the HP 3000 Series II. Three basic models span the competitive range from the DEC 11/70 through the IBM System/3-10 to the 370/115 and 125. Concurrently, the $1 billion company unbundled its software and support. EDP/IR sees the new systems and HP's marketing and backup strategy as a sign of new forces at work in the industry and will take a closer look in a later issue.

• CLOTHING A PRODUCT FOR ONCE, Computer Automation has finally entered the business systems market with what it calls SyFA . . . a 64 KB (core) system geared for distributed processing. SyFA supports up to 8 disk drives (10 or 80 MB) and up to 24 terminals. A basic system starts at $54,000. The CPU and operating system, says the company, were designed together from the ground up -- software wasn't simply added to the Naked Mini.

• UP TO 500 USERS WILL BE ABLE TO ACCESS A CYBER 70, MODEL 71, says CDC about its latest product. Designed for batch and timesharing applications, the new system uses a distributed architecture of 10-20 programmable (4K) processors. A Cyber 71 with 65K of memory and 10 smaller processors costs $305K or rents for $6,775 a month on a 3-year contract. The system is compatible with other CDC products.

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"THE GRAY SHEET" JUNE 16, 1976 • VOL.11,NO.22 P.J.McGOVERN,PUBLISHER

Light heavyweight bout

SPERRY UNIVAC LAUNCHES ITS VS 90/80 AT NCC
CLAIMS APPROXIMATE IBM 370/158 PERFORMANCE AT 370/145 PRICES

Typically, I suppose, the accomplishments in this industry have not been limited to the brilliant, master stroke variety. There has been a lot of trench warfare involved . . . .

-- J. Paul Lyet, Sperry Rand Chairman
keynoting NCC, June 7, 1976, NYC

Indeed, the orderly chain of events leading to Sperry Univac's unveiling of its new 90/80 Virtual System shows more the polish of workmanship than the sheen of masterstroke. Building up to the company's announcement on the second sweltering day of this year's NCC were:

+ The announcement in late 1973 of the 90/60 and 90/70, aimed at 360/30 and 360/40 users and promised with a powerful new operating system (OS-7).

+ The announcement two years ago of the 90/30 and subsequent popularity of the small 9200 and 9300 successor.

+ The introduction in January, 1975, of the VS-9 operating system, based on RCA's VMOS, and halt to the further development of OS-7.

+ The introduction in late 1975 of conversion aids to help Univac OS-4, and Series 70 DOS and TDOS users switch to VS-9.

+ The announcement this March of conversion aids for IBM DOS/VS users going to VS-9 and 360/370 DOS emulation software for 90/60s and 90/70s.

+ Nippon Univac's introduction last month of a 90/80 version for Japan, where users are rapidly topping out on 90/60s and 90/70s.

So, whether by masterstroke or steady toil, the Sperry Univac 90/80 is here . . . with the company's development weight thrown behind VS-9 and the upgrade paths greased for non-VS Sperry users and the IBM 370 clan. Besides 90/60, 90/70, and Series 70 upgrades, Sperry plans to court dissident 370/145 users especially -- looking for as much as 25% of 90/80 sales from them. And when the system sees its first deliveries this fall conversion aids for the 370/145 will be available.

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The system itself, which comes with 524 KB to 4 MB of semiconductor memory, is different from other Series 90 models though, principally because of:

- New technology -- processor circuitry utilizes emitter-coupled logic (ECL) and multilayered packaging. Memory and CPU cycle times are significantly faster than on the smaller systems.

- New architecture -- the 90/80 uses an instruction processor and separate peripheral processor, connected independently to main storage by high-speed (8MB/sec) data paths and a storage interface facility.

- New competitive thrust -- while the 90/60 and 90/70 were aimed to intercept 360 users upgrading to 370s, the 90/80 goes directly to the 370 upgrade market. Its microprogrammed instruction set is a superset of 90/60, 90/70, and all nonprivileged IBM 360 and 370 instructions.

And by adding a new look to the Series 90 line, the 90/80 also suggests there may be more to come . . . after all, distributed architecture and microprogrammed instructions sets bespeak product line versatility. Someday, perhaps, that versatility could be used to meld the Series 90 with the 1100 side of Sperry's line.

Measuring up

For wooing 90/80 customers, Sperry offers these performance comparisons, with the 90/70 as a standard:

System	Performance Ratio	Price Ratio	Perform/ Price	Main Store	Maximum Channels	Data Transfer Memory	Data Transfer I/O
90/80	2.5	1.1	2.10	4MB	7	16MB	8MB
370/158-3	3.0	1.5	1.96	4MB	5	8MB	6.75MB
90/70	1.0	1.0	1.00	1MB	5	6.7MB	5.6MB
370/145	.9	1.1	.81	2MB	4	4MB	5.3 MB

Under the manufacturer's best contract, says Sperry, a 1 megabyte 90/80 with appropriate disk, tape, printers, etc. costs only $44,284 a month. Sperry prices a similarly configured Burroughs 6760 at $47,533, a Honeywell 66/60 at $54,697, IBM 370/158-3 at $60,515.

As a result of these comparisons, Sperry feels it's well qualified to tackle IBM's sagging 370 middle (see memory chart, EDP/IR,May 28,1976) . . . and, indeed, for a barebones CPU (524K) costs 45% less to purchase than a 370/158-3.

At an average of $220K/524KB of add-on memory, however, EDP/IR notes that the gap dwindles as memory is added. At 4 MB, both CPUs cost about the same to buy. But equal memory comparisons may not be valid . . . as Sperry claims its VS-9 will give users the functionality of IBM's MVS at the smaller overhead of OS/VS-1.

Interception statistics

Although Sperry contends that 40% of the computers it shipped last year landed in a "competitive environment" -- another vendor's system was bumped or a new application implemented -- the most ready market for 90/80s will be its own base. Says Sperry, 85% of the systems it acquired from RCA are still installed . . . and some of the 90/70s now in use may be straining at their upper limits.

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A CHAIRMAN EYES THE ROAD AHEAD

At the 90/80 press conference, the state-of-the-company address had a satisfied tone. Sperry Univac, pointed out its spokesmen, had grown solidly since the RCA acquisition. In the four years that ended on March 31, 1976, they said, Sperry Univac saw it's computer business:

Revenue grow from $750 million to over $1.4 billion

Bookings grow from $700 million to over $1.2 billion (purchase value)

Shipments grow from about $700 million to over $1 billion

Installed base grow at a compound annual rate of 19% to $7.4 billion

The picture presented was one of the same solid, steady progression in the financial realm as that in the technological realm leading to the 90/80. But speaking at the NCC keynote address, Chairman J. Paul Lyet, voiced some misgivings about the road ahead for the industry. In particular he worried about:

- Capital restrictions -- the $1 of assets required for $1 of revenue in this business is getting harder to find. Tax law changes -- to the investment tax credit, for one -- are a possible avenue of relief.

- Financial standards -- with inflation, current reporting methods understate depreciation (replacement cost of assets) and overstate earnings.

- Competitive restraints -- overseas, especially, nationalistic goals have led to competitive barriers, and shotgun restrictions aimed at IBM have often hurt others more. But U.S. firms must be realistic . . . and accepting a minority position (e.g. Sperry and Saab) can have its rewards.

Then Lyet countered his own worries by looking behind historical industry benchmarks to its people: "So -- young, bright, creative, experienced and able -- America's corps of computer specialists and professionals is one of its greatest assets and the solid basis for an optimistic future for the industry."

As for possible IBM defectors, the latest study by IDC on migration patterns of IBM users shows that, in 1976, at least:

- Of the 1900 370/145s installed in the U.S. on 1/1/76, 15% will be replaced; 64% of these will migrate to 370/158s or 155s.

- Based on user surveys conducted late in 1975, IDC predicts only 11 of those migrating 145s will be replaced by non-IBM systems.

- Almost 65% of the 266 370/158s expected to be installed by current IBM users are expected to come from the 145 fold.

The IDC study and user surveys, however, were conducted before the 90/80 was announced, so it's possible the numbers could change . . . but that was also before the Giant's latest memory-related price cuts increased the 158's purchase attractiveness. It's not impossible, theorizes EDP/IR, that -- despite the company's assurances to the contrary -- the 90/80 may run into competition from the newer Sperry 1100s when it goes after defecting 145s.

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Finally, as if the market isn't tough enough already, migration statistics for 1977 and beyond -- when 90/80 production should be in full swing -- could be affected by as-yet-unannounced products from IBM. The 370/135 and 145 were conspicuously unaffected by IBM's price cuts last month . . . and many observers drew the conclusion that more drastic sprucing-up is in store for the two.

Looking westward

In a way it's not surprizing that the 90/80 first surfaced in Japan, where a government-industry combination is mounting an attack on IBM dominance. As Nippon Univac President, Shiro Omata, reiterated at an NCC plenary session, Japan is committed to its computer industry -- planning a government infusion of $3 billion in subsidies over the next decade or so . . . much of which will be funneled through a Ministry of International Trade and Industry (MITI) project for developing very large-scale integration (VLSI) announced a year ago (EDP/IR,July 30,1976).

Delineating Japanese expectations for large-scale computers ($833K and up purchase price) is a recent long-range MITI study of the Japanese computer market. It charts the large-scale computer base growing from $4.5 billion in FY 1975 to $11.4 billion in 1980. Large-scale computers show the only class growth factor larger than the industry total of 2.4; by 1980, says MITI, large-scale computers in Japan will account for two-thirds the value of the total base.

Perhaps because Japanese mainframer Oki Electric is not directly in the line of fire for MITI's VLSI money, Oki Kaisha will be handling Sperry's manufacturing duties for Japan . . . and possibly other markets as well. Oki may thus repair some of the damage done to its mainframer image by the VSLI pass-by.

Sperry, meanwhile, achieves Japanese domestic manufacturer status. Users buying a Japanese 90/80 (OUK-90/800) are thereby eligible for government financing through the Japanese Electric Computer Company (JECC) . . . and Sperry aligns itself with one of the fiercest IBM-competitive blocks around. And that, thinks the company, should be good for business.

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NCC: AN INDUSTRY'S EKG

The people came . . . and came and came to NCC 1976. (Bicentennial. The Big Apple. Twenty-five years of computer conventions, joint, national, or otherwise.) More than 35,100 people streamed past 304 exhibits in 932 booths . . . sticky Gotham weather and Data General belly dancers notwithstanding.

The numbers and the press of flesh harked back to the whirlwind atmosphere of Boston and Las Vegas circa 1969. Whiffs of late 1960's show biz -- including magic acts, computerized fortune-telling, and a miniature three-ring circus -- were in the air.

But basically, both exhibitors and users came for a more serious purpose -- to see if the recovery was indeed real. And they found the signs. For beyond the bustle, a progressive, positive, purchase-oriented atmosphere pervaded the coliseum. It seems that once-shelved plans are being taken down and dusted off . . . buying in a bicentennial year.

Computer users are going into action.

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Minicomputer accessories

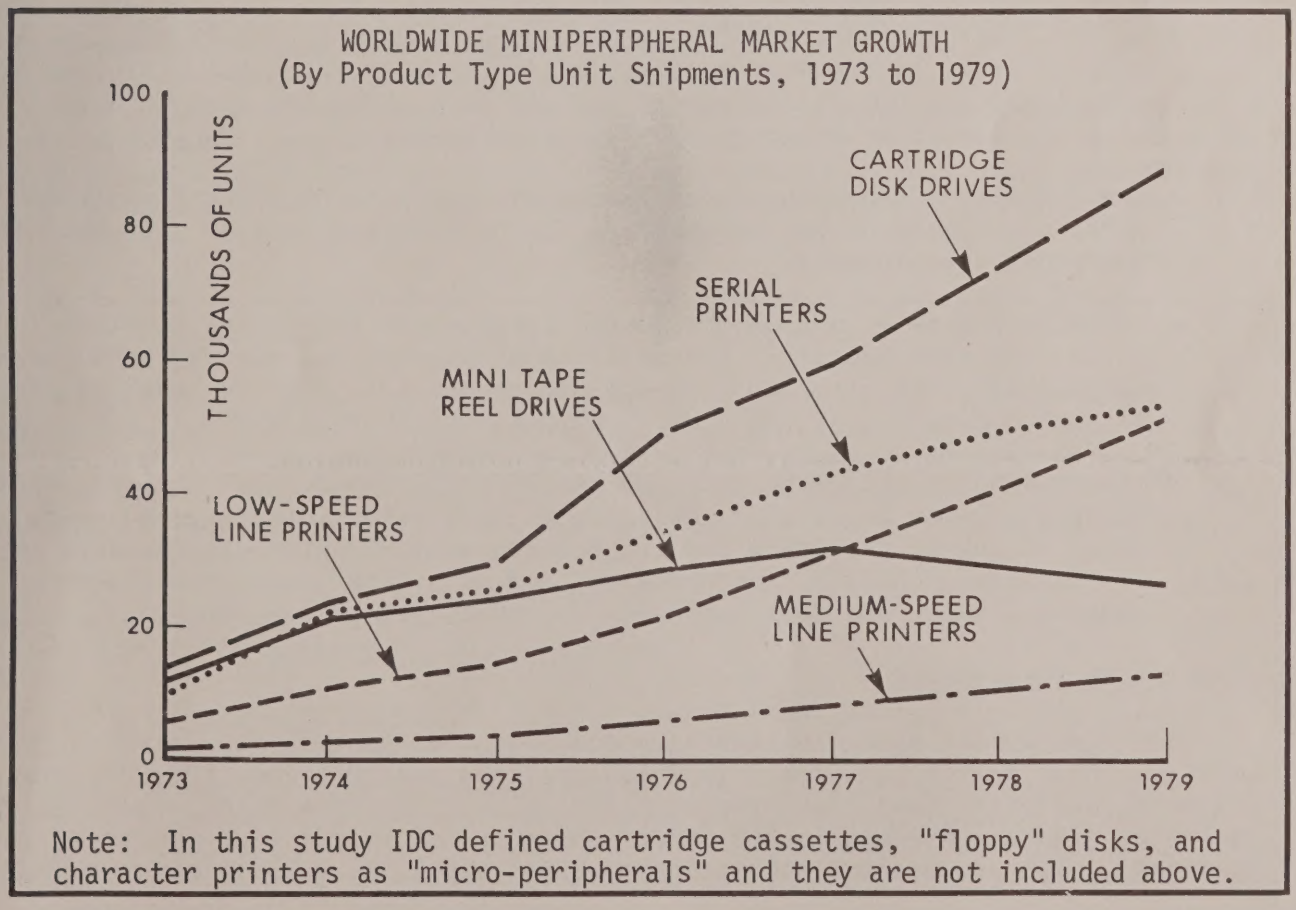
CDC, MICRODATA, AND OTHERS EXTEND THEIR MINIPERIPHERAL LINES AS THE INDUSTRY SEES TRANSITION AND REBOUNDING GROWTH

Anyone wondering if the OEM-oriented miniperipherals industry had yet begun to recover from the 1975 doldrums had only to walk the NCC convention floor for an answer. Companies like Shugart, Wangco, Pertec, Diablo, Centronics, and others furiously hawked their wares . . . while minicomputer vendors showed their new stuff and mainframer CDC even used video puppets to discourse on the matter. The minicomputer industry's stepchild is coming of age.

An NCC sample of the renewed vigor in miniperipherals:

- New "Winchester" type disks from both CDC and Microdata. The CDC model can store up to 24 megabytes and costs $3K in OEM quantities; the Microdata disk, dubbed "Reflex," handles 10-50 megabytes of formatted data.
- Also from Microdata, a 10 megabyte tape cartridge, called the "Lodestar," which records at 6250 bits/inch.
- A microprocessor-driven communications terminal/printer from Diablo with substantial graphics capabilities thanks to the electronics.

And, in fact, there were many more examples -- as printers, plotters, minidisks, paper-tape readers, floppies, etc., all competed to catch the eyes of convention goers and potential shoppers.



Note: In this study IDC defined cartridge cassettes, "floppy" disks, and character printers as "micro-peripherals" and they are not included above.

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MINIPERIPHERALS AT OEM/SYSTEMS HOUSES

One of the major markets for miniperipherals is the firm that buys both minis and miniperipherals, adds system integration and software, and then markets an end unit . . . and as of 1975, IDC has maintained a file on such systems houses. Extrapolated from that file of over 1,000 firms is the following information on miniperipherals usage. Percentage figures reflect the number of firms that buy peripheral units from other than the CPU manufacturer.

Peripheral Usage

Main Memory	38%	Line Printer	52%
Character Printer	47%	Hardcopy Terminal	47%
CRT Terminal	69%	Graphics Output	10%
Mag Tape (1/2")	46%	Cassette/Cartridge	27%
Disk Pack Drive	32%	Disk Cartridge Drive	38%
Floppy Disk Drive	30%	Paper Tape	36%
An/Dig or Dig/An Sys	29%		

(The largest supplier of CPUs to the file was DEC with 35% penetration, followed by Data General with 20%. Intel was cited by 14%, Hewlett-Packard and Interdata at 6%, and Computer Automation, General Automation, Motorola, and Varian at 4%.)

Transition and growth

Setting aside for the moment defintions of what constitutes a "miniperipheral" per se, the industry seems to be in a state of transition:

- As CPU costs continue to drop, the need for inexpensive peripheral gear intensifies. As one Microdata official noted, the IBM choice of tape cartridge over flexible diskette for its 5100 shows the need to anticipate the impact of on-going technological trends.

- Conversely, as microprocessors find their way into peripheral controllers, new functions and capabilites can be imparted to some very basic, inexpensive equipment.

- As markets grow -- and as OEM buyers increase their systems acquisitions from mini houses -- the concepts of service and support begin to trickle into the normally iron-oriented business. This was much of the message coming out of CDC's miniperipheral exhibit at NCC.

- Miniperipheral customers must constantly decide whether to make or buy their equipment . . . and a decision to vertically integrate can wreak havoc on suppliers with a few large customers. Counter-options seem to lie in establishing a broad product line, courting a wide mix of customers, finding new applications . . . or in getting acquired.

Competitive envirnoment

IDC's defintion of miniperipherals includes reel-to-reel tape units (<75ips), cartridge disk drives, low-speed (250-500 lpm) and medium-speed (500-1000 lpm) line printers, and high-speed character printers (<100 cps). Cassettes, floppies, and character printers are considered "micro-peripherals" -- and find extensive use in terminals, word processors, accounting machines, etc., as well as minis or micros.

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Thus categorized, the miniperipheral market, says IDC, will grow at an average annual rate over 20% between now and 1980 -- from just under $290 million in revenues for 1975 to almost $750 million in 1980. About 30% of these revenues will come from shipments to minicomputer suppliers. Unit shipments -- important in an OEM environment -- should grow as shown on page 5.

Within this market, each product category is heavily dominated by one vendor, with few companies participating in more than one segment. All of the dominant suppliers, plus the largest OEM peripheral maker in general -- Control Data -- occupy the top ranks of the miniperipheral market:

- Centronics (18% market share in 1974) is the high-speed serial printer supplier -- but is expanding into other markets through the acquisition of Data Printer and new products (EDP/IR, April 21, 1976).

- Dataproducts (14%, $33 million) is spread across both line printer sectors, with revenues from other printer markets as well.

- Diablo -- the driving force behind the disk drive market, where it generated over $30 million in 1974 -- also dominates the low-speed OEM character printer market.

- Pertec's $27 million revenues in 1974 covered not only mini tape reel drive products, but also significant shipments in cartridge disks.

- Control Data (12%) is strong in low/medium-speed printers and top of the line cartridge disks. Now the company is also into serial printers and "Winchester" type disk modules.

In a separate study done in late 1974, IDC predicted that floppy disk shipments would grow from 17,000 units worth $7 million in 1974 to 210,000 units worth $71 million in 1978. Current feedback from vendors indicates that this forecast is still pretty much on target -- with 1976 shipments pegged at 94,000 units worth $34 million. The dominant suppliers are still Memorex and Shugart.

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TAKING A RIDE ON THE INK-JET

On September 22, 1972, the A.B. Dick Company signed a licensing agreement with IBM for the use of its ink-jet technology. At the time, A.B. Dick had an ink-jet printer, the Videojet, on the market -- but it had problems with clogging nozzles and inadequate resolution. Its technology was unique, however, in entailing the deflection of the ink jet (cutting the number of nozzles needed).

IBM went to work -- copping about half the final patents issued in ink-jet line printing in the last two years -- and last week announced the 46/40. It also entails the deflection of the ink jet.

What it means is this: If IBM has indeed overcome the inherent hassles of ink-jet printing, high-speed computer output may be in for some changes. Mead's ink-jet printer has been clocked at 45,000 lpm -- which puts IBM 3800 speed to shame. If the 46/40 proves reliable -- and maintenance prices on it indicate IBM has faith that it will -- the 3800 may be a one-generation system. And if there is an ink-jet boom, those best placed to take advantage of it include IBM, A.B. Dick, Mead . . . and the Japanese.

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• HARRIS HAS SOME NEW EDITIONS FOR AUTOMATED NEWSROOM BUFFS -- adding models 2560 and 2570 to the 2520 and 2550 copy-processing systems already in the family. The announcement comes in the wake of a contract to automate the newsroom of the New York Times (EDP/IR,Mar.12,1976). In order from the 2520 to 2570, the systems can handle up to 24, 48, 96, or 384 editorial terminals and support 32, 64, 128, or 128+ disks. In addition to larger capacity, the new models have dual CPUs -- Harris' answer to editors worried about downtime at critical moments. The company has also introduced two new terminals: the 1520 with individually programmable (8 function) keys, and the 1700 with dual screen CRT for copy comparison and merging. Approximate base prices for the four 2500 systems are $160K, $400K, $700K, and $1 million. Now what could Woodward and Bernstein do with that? . . .

• NCR HAS A NEW DISTRIBUTED PAPER SHUFFLER, also known as the NCR 7750 Distributive Document Processing System. Documents are entered at the "operator proof" operator station and processed by a MICR-reading minicomputer (the same processor that powers NCR's 399, 499, and 8200). At the same time, validated data is put on magnetic tape, providing, says NCR, throughput at rates 15-20 times faster than traditional systems. A minimal 1-station system with 64K processor, I/O writer, 2 cassette tapes and 4-pocket module costs $38K or rents for about $1K a month. An 8-station system can cost $33K or $9K per month.

• WANT 370 CAPABILITIES AT SYSTEM/3 PRICES? Honeywell says it's possible with its recent enhancements to its Series 60 Level 62 small computers. The maximum memory has been jacked to 131 KB and 262 KB for the 62/60 and 62/40 respectively; and the systems can now utilize two communications controllers to handle up to 10 lines. Peripheral enhancements include a new high-speed disk controller and 80 MB module, new table-top card readers, and capability to attach some more Series 60 I/O peripherals. GCOS software was also enhanced in a new release. The improvements, says Honeywell, will become available in late 1976 or early 1977.

• DID YOU EVER SEE SO MANY COMPUTERS ON-LINE? Well, it's a play on words, actually, but EDP/IR publisher International Data Corporation teamed up at NCC with Software AG of "ADABAS" fame to demonstrate a real, live, honest-to-goodness on-line data base. IDC's file contains detailed information on 31,000 computer sites and 48,000 systems just in the U.S. Under the software system ADABAS, such information is readily retrieved and manipulated . . . even by salesmen and editors.

• HOME TO ENGLAND FOR THE BICENTENNIAL: two Burroughs B 7700 computers worth a total of $10 million. Midland Bank Limited, one of the four biggest banks in the U.K., will be replacing its current B 6700s with the new 4-CPU machines.

• TELENET'S PACKET-SWITCHING ANTE WILL BE A LITTLE LESS, according to a revised tariff filed recently with the FCC. The company, which demonstrated its network in a special exhibit at NCC, says it wants to lower access rates for large volume users. Each of Telenet's 45 presently installed offices will be designated as a low-, medium-, or high-density point . . . with access rates varying accordingly ($1.40, $2.40, and $4.80 per hour). The traffic charge is still 60¢ per kilopacket, regardless of distance transmitted. For central offices, access charges will drop to 70¢ an hour after an initial period of use each month. Telenet says its sliding rate structure compares favorably with such alternatives as WATS usage.

• SORRY, WRONG NUMBER. Last issue (May 28, page 5) we inadvertently gyped Ma Bell out of a mere $4 billion in 1975 revenues. The correct amount is $29,591M.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JUNE 24, 1976 • VOL.11,NO.23 P.J.McGOVERN,PUBLISHER

Anatomy of a buzzword

DISTRIBUTED PROCESSING TAKES SHAPE IN THE MARKETPLACE AS MAINFRAMERS, MINI VENDORS, TERMINAL MAKERS, ET AL, PAY FEALTY

If there is one word in the English language that has been used and abused, courted and co-opted, more than any other by the computer community lately it's got to be "distributed." Processing, functions, architectures, systems -- just about any other prevelant computer-related word can be modified by the up-and-coming adjective. It's a one-hundred-and-ten-decibel buzzword.

But there's a reason behind its popularity. Technology at one end and system complexity at the other are driving data processing to its source -- the concept of "distributed computing" is starting to gel in the marketplace:

- Mainframers . . . are structuring their newest offerings with communications, modularity, and internal distribution of functions in mind. Good examples: NCR's Criterion, Burroughs' 800s, Sperry's 90/80, and IBM's push on SDLC terminal/communications equipment.

- Minicomputer makers . . . long accustomed to the use of their products in de facto distributed systems in labs and factories, are gaining the maturity and marketing savvy to push into new, and much bigger markets in commercial data processing. Examples of mini vendors wooing giant corporations with growing decentralized needs: All of them.

- Data entry equipment suppliers . . . discovering that keypunch replacement is not a cost effective use of their equipment, are adding processing and communications capabilities -- and thus another level of "distribution." See also: Entrex, Inforex, Four-Phase, and more.

- Terminal makers . . . by adding local programmability and storage, find their products vying in new markets. What makes an intelligent terminal in standalone mode with disk storage and software different from a small computer? Ask: Datapoint, Sycor, Incoterm, and others.

- Communications carriers . . . are engaged in fierce combat -- for survival, in some cases -- spurred by the prospect of data communications growth. If Congress allows, serving the future distributed networks will be: Datran, Telenet, Satellite Business Systems., etc.

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HARDWARE IMPETUS FOR DISTRIBUTED COMPUTING

The hand of technology in bringing distributed computing from concept to reality can be seen in the comparisons below. Though a bit simplistic -- there's more to computing than hardware -- they show the disparity in cost that prompts users to take advantage of the semiconductor advances engendered in the smaller processors. The tradeoffs lie in mass storage and nonhardware costs.

Characteristic Per $ of Purchase Price	Mainframe	Minicomputer	Microcomputer
Instruction Executions Per Second	.65 - .8	25 - 100	250 - 1,000
Memory Capacity	4 Bytes	4 Bytes	4 - 8 Bytes
Random Access Storage In Bytes	4K - 8K	1K - 2K	150 - 250

Although definitions of distributed computing have long been both many and muddy, actual products and applications serving it are beginning to appear. And whether you call it distributed, distributive, or dispersed processing or computing . . . in a business data processing environment, at least, EDP/IR detects four distinct levels of the phenomenon:

- Distributed input/output -- characterized by the use of remote-batch terminals, editing CRTs, or intelligent "emulators" of them.
- Distributed data entry/validation -- a domain populated by the key-to-disks, intelligent terminals, and the IBM 3740.
- Distributed inquiry/response -- where files, and file updating capability come into play along with data management software. Minicomputers and conversant small business systems can be involved.
- Distributed job processing -- in which autonomous DP operations can take place remotely. Full peripherals and operating system capabilities are required, and processors can range from minis to full-scale general-purpose (but satellite) computers.

It's within this framework that computer industry suppliers will be marketing their current products and planning their new ones. The question is what level of distribution will the most users (and user dollars) adopt?

Anarchy vs. Hierarchy

In a business data processing environment, a distributed processing system must almost automatically be hierarchical -- there is a host computer somewhere. Even in companies with decentralized organizations, the nature of the data -- as used by businesses -- still mandates a hierarchical structure. Hence, along with the growth of distributed systems will come host site growth . . . data base management systems, large computers, etc.

(An example of a nonhierarchical system would be the Defense Department's Arpanet. Such horizontally distributed -- or "anarchical" -- systems provide on-

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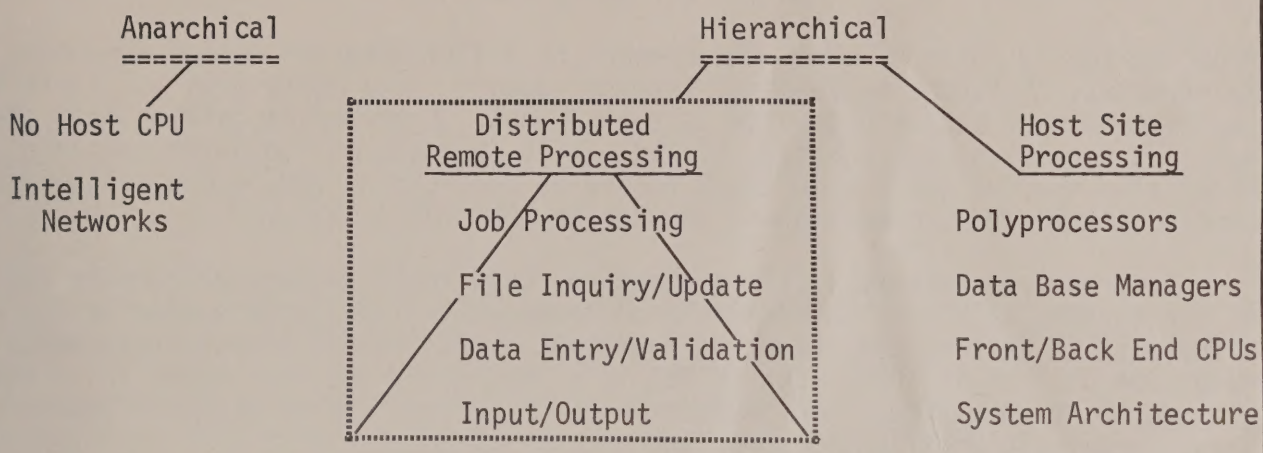
DISTRIBUTED COMPUTING CONCEPTS



Note: of the two flavors of distributed computing, the "anarchical" is network-oriented, with processing sites independent of one another. The "hierarchical" is computer- or data-oriented.

As customarily referred to, distributed computing/processing encompasses one or more of the levels listed in the "Distributed Remote Processing" box.

demand resource sharing and feature computer-to-computer communications with no one system as "host." Such systems are good where disparate computer power is to be shared or unrelated data bases maintained by the various remote sites. But most businesses still have company-wide data bases too big or too proprietary to disperse in a nonhierarchical manner.)

As the levels of distribution increase from simple distributed I/O to distributed job processing a problem arises . . . what to do with the data base? How much of it should be duplicated at remote -- or host -- sites? Can it be logically sectioned, say geographically? What are the cost benefits or drawbacks?

User patterns

Compelling users in the direction of distributed computing are the cogent cost benefit arguments. Although software costs increase, these can be offset by hardware savings (see box, page 2), lower communication line charges, and personnel savings inherent in source data capture. In addition, throughput and reliability increase as the job stream becomes less constrained by the mainframe or vulnerable to downtime.

But there are disadvantages to distributing processing functions:

- As processing functions migrate outward, network control and host site data base management increase in complexity. Thus, so does the cost of software. And the more programming done at remote sites, the more "reinventing the wheel" -- with its attendant duplication of costs to the overall organization.

- Distributed processing systems are more likely to be multivendor setups than centralized operations. For many users, this represents a significant deterrent to distributed computing.

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HEWLETT-PACKARD AND THE MINI INDUSTRY: A CASE IN POINT
or
HOW YOU GET THERE FROM HERE

From the supply point of view, the avenues to distributed processing are many. Mainframers, minicomputer vendors, terminal makers, data entry guys . . . all are paying more than just lip service to the subject. Everybody's getting into the act, but perhaps none are better poised for it than the minicomputer companies. After all, they've got a good track record at end-running IBM, and up until recently distributed processing was counter to IBM's philosophy.

Take Hewlett-Packard. It's a standard, heads-up minicomputer company (17% of the market, $235 million mini-related revenues in 1975) with extensive footholds also in testing and measuring equipment. Its overall company revenues were about one billion in 1975. Behind DEC it's the number two mini maker . . . and last month it announced a new product which it called "appropriate for use in large numbers in distributed computing networks."

It's the HP 3000 Series II, and it comes in three basic models:

- Model 5 ($110,000) with 128 KB to 256 KB of semiconductor memory, a 15 MB moving-head disk (up to 4), 1600-bpi tape, and ability to accommodate 31 terminals. Options include up to four line printers, and eight 47 MB disks. Software includes the operating system, some utilities, and HP's System Programming Language. Other high-level languages are optional.

- Model 7 ($150,000) with two 47 MB disks instead of the 15 MB disk on the Model 5, and the same hardware options as the Model 5. With the Model 7, however, COBOL, RPG II, and HP's data base manager IMAGE with QUERY are standard. Fortran and Basic are optional.

- Model 9 ($190,000) with 320 KB to 512 KB memory, pretty much the same hardware options as Model 7, but capacity for more tape drives and capability to support up to 63 terminals.

As hardware, the three models don't look any more earthshaking than anyone else's newest superminis -- the line is endowed with a new memory system and faster processor -- but HP has a new marketing twist. With each model the company singles out a distinct market it's to serve. Model 5 competes, says HP, with other superminis like DEC's 11/70, Model 7 goes after small business system upgrades in the IBM System/3-10 range, and Model 9 strikes at the bottom of the 370 line. In each case, the cost benefits of HP's technology are proffered as the salient selling point (four times earlier HP 3000 performance at 10% less cost).

And so Hewlett-Packard aims at the distributed processing market from the outside . . . for in hoping to convert IBM batch system users to the terminal/communications-oriented 3000 Series II it hopes to influence users' data processing philosophy and filch applications from the computer room.

Moreover, HP predicts success. The company expects its current installed base of 3000s (250 now) to double in nine months to $100 million worth. And predicts HP, 80% of the systems will land in business data processing applications and 60% will be involved in data base applications. Sales of 3000s, says HP, are growing faster than any other product in the company.

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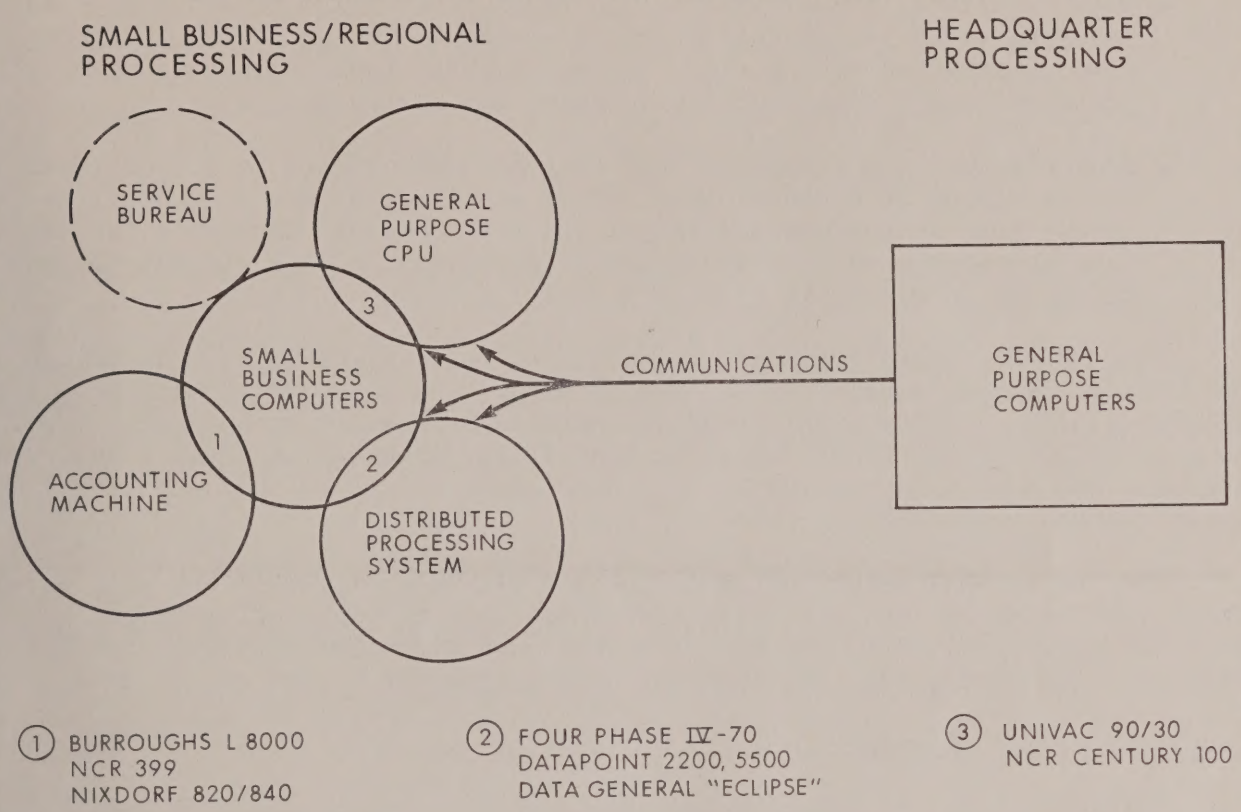
THE INTERSECTING MARKETS OF DISTRIBUTED PROCESSING



With a flip of the imagination, any of the circles with communications to the host computer can be interchanged. The Series 3000 II strikes at the intersections of the various markets, thus -- depending on the applications in which it eventually lands -- qualifies as a distributed processing system.

Distributed marketing

Along with the introduction of Series II, Hewlett-Packard unbundled. For the Series II, the company now offers hardware and software maintenance, consulting, training, and documentation in a comprehensive "menu" of support services. Only site preparation and system installation -- two services all sampled users agreed they'd need, says Hewlett-Packard -- come with the price of each system.

This may be the real Series II advantage. For unbundling can provide a modularity to turn a standard mini into a system that can be placed in several slots within the distributed hierarchy.

It may also signify that:

+ Users are getting more sophisticated. After all, if they are willing to substitute or supplement a batch-oriented general-purpose system with a real-time minicomputer surely they may be advanced enough to take advantage of unbundling.

+ More and more, the successful mini vendor will have to put relatively more effort into support and service than into the production of iron. The pricing and marketing of unbundled services and software is a complex -- but rational -- way of aligning development costs with income.

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- With satellite communications (and later fiberoptics technology) promising to slash communications costs someday -- coupled with multiprocessing advances taking place in the computer room -- much of the cost pressure toward distributed processing may disappear.

- Grosch's Law, which asserts that computer performance is proportional to the square of computer cost, still promises savings in centralization. But, as systems get larger and more complex, "Murphy's Law" may take precedence over Grosch's Law. (Murphy's Law says simply: "If anything can go wrong, it will.")

As a result, users are still reluctant to rush pell-mell into distributed processing. Recent studies by IDC have found that while "distributed processing" is probably the hottest single topic among data processing management . . . there is still considerable confusion as to what it is, interest is often industry-dependent, and most managers see it as a supplement -- rather than substitute -- to their central computers.

In a recent IDC survey of 50 of the top IBM users (370/155 and up), it was found that although 100% of those interviewed said they used distributed I/O, less than 50% were involved in the next two levels of distribution. Only two had distributed data bases, and less than 10% said they would by the end of 1977.

Suppliers' point of entry

Whichever level of "distributed-ness" users settle for as they recoil from centralized and unwieldy DP operations, suppliers are choosing distributed computing as a wedge into new markets -- and the various sectors of the industry from which they come are feeling the reverberations (see pages 4&5).

(One of the reasons may simply be that IBM has been slow in catering to the hardware and software needs of users wishing to reorganize. In the survey mentioned above, for example, only 12% of those interviewed were currently using SNA-supported terminals with 54% planning to by the end of 1977. IBM's recent software announcements extending SNA support to TCAM users may alter this percentage, however, since it cuts operating system overhead and conversion costs.)

For suppliers who see distributed computing as a point of entry into the marketing of related products -- especially as they fill needs higher up the hierarchical ladder -- EDP/IR identifies what it feels are three important characteristics of the compleat vendor:

+ An ability to manufacture the processing element. Whether it's Raytheon parlaying its RDS-500 CPU and PTS-100 terminal experience into a distributed processing system (PTS-1200) -- or Sperry Univac birthing a UTS 400 family -- there must be some base from which to launch a distributed-processing product. An example in contrast is Decision Data's trouble turning its peripherals strength into a small business computer.

+ A sophisticated software offering. The clue to making a hierarchical distributed system work smoothly lies in its many layers of software . . . and here there is still some chance for the nonhardware supplier to get into the act. But as more and more hardware is designed with software in mind -- e.g., Data General's "Eclipse 300" -- that edge may wear thin. So too, as microcode replaces hardwired logic.

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+ IBM -- or IBM network -- compatibility. Compatibility with other mainframes may suffice, of course, but it's a fact of life that most of the products slipping into the hierarchy of "distributed-ness" will be in a pipeline that ends at an IBM CPU. Said one user at NCC whose company supplements three large IBM mainframes with several hundred minis in distributed processing applications: "I will stay in the IBM mainstream. We will go right along . . . even though IBM today probably doesn't even know what SNA is."

When it's all said and done, in EDP/IR's opinion, "distributed computing" is still pretty much a buzzword. The wholesale dissolution of computer rooms into networks of disembodied processors just won't happen. Instead, the age of distributed computing will advance upon us step by step, product by product. And that may be where the real excitement lies.

-- John Gantz, Managing Editor

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JES a li'l tweak

IBM UPDATES MVS WITH ENHANCEMENTS TO JES 2, SCHEDULER AS USERS MIGRATE STEADILY TOWARD VIRTUAL STORAGE

At first it seems like a minor item . . . another release (3.7) of IBM's OS/VS2 operating system. And in a way it is. The Giant upgraded its JES 2 job entry software to provide a new track access procedure with its 3340 and 3350 disks and simplified the JES 2 installation procedure along the way. It also enhanced its MVS Scheduler by improving its device allocation segment.

But even if it's a minor adjustment, it's a minor adjustment to MVS. And the Giant's tuning of the massive software system may be as important to tomorrow's users of new systems as to today's 370 clan . . . for along with the trend toward remote distributed processing (see page 3), there's a similar trend in the computer room itself. And that trend is a software phenomenon. Note:

- It was OS/VS2 Release 2, announced in August, 1974, that increased virtual storage capacity from 16 MB/system to 16 MB per partition and provided support for "tightly-coupled" multiprocessing under JES 2.

- JES 2 Multi-Access Spooling (MAS), released in March, 1975, with OS/VS2 Release 3, then provided for "loosely-coupled" multiprocessing -- where two to seven processors linked by common disk subsystems share jobs and peripherals, but not main storage.

- In October, 1975, JES 3 was released, allowing for loosely-coupled multiprocessing of up to four CPUs via channel-to-channel links. One of the processors is designated as a "global" system and commands the net of "local systems."

In a way, then, the real evolution of the 370 line -- memory enhancements, cache buffers, and MOSFET notwithstanding -- is to be found in its software enhancements. And users are responding. According to a recent IDC study on the migration patterns of IBM users, 55% of the 370/158 and 75% of the 370/168 users sampled will be operating under OS/VS2 by the end of 1977. And in another IDC study -- where 50 of the biggest IBM users were interviewed -- 62% of those surveyed said they would be under MVS by the end of 1977, up from 14% in 1975.

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• LAUNCHING A SECOND "INVASION" OF U.S. SHORES, ICL has introduced its ICL 2904. Faster than the 2903 and with double its storage capacity (128K to 384K characters), it comes with up to 510M characters of disc storage. It can also support various disk configurations, including floppies, and several varieties of tapes. The 2904 has six communications channels and three types of line printers available. A year an a half ago the British mainframer introduced the ICL 2903 to the U.S. market (EDP/IR,Dec. 4,1974).

• AT&T'S REVENUES ARE UP $1 BILLION THIS QUARTER OVER LAST YEAR, with net earnings of $940 million for the three months ending May 31, up from $799 million last year. Annual net earnings for the year ending May 31 were $3.4 billion on revenues of $31 billion. So, for all of AT&T's complaints to Congress about competition threatening revenues and rates . . . AT&T boss, John deButts, was moved to say: "1976 looks like it is going to be a very good year."

• SOUTHERN PACIFIC COMMUNICATIONS COMPANY, one of these competitors AT&T thinks should be reformed (EDP/IR,May 28,1976), has filed a tariff amendment with the FCC for satellite transmission service (STS) between 73 city-pairs at what it says are competitive rates. SPCC already has a terrestrial microwave network to 45 cities and with STS would provide satellite communications to 16 cities. Customers could thus partake of satellite and terrestrial communications from the same carrier.

• CHARGING INTO CCDs UNDER GOVERNMENT CONTRACT IS TRW, which so far has produced a 3x3-bit adder and 4x4-bit multiplier for the Naval Research Lab. The devices are expected to lead to a Fast Fourier Transform Analyser (!) on a single chip by 1977. By late 1976, 100K-bit memory arrays are expected.

CCDs offer considerable speed/power improvement over both n-MOS and I^2L devices and can store several million bits of data on one monolithic integrated circuit -- but require data handling in block transfers (see EDP/IR,Aug.29,1975). TRW expects to be able to duplicate many minicomputer logic and arithmetical functions on a single CCD chip by next year. CCD, Si!

• THE WIRES WILL BE HUMMIN' WITH A NEW SERIES FROM WESTERN UNION -- the 4000 family of Network Processors. The first member, introduced this month, is an intelligent time division multiplexer (TDM) called the 4100. WU says it provides dynamic reconfiguration, accumulation of network performance statistics, and centralized network control. The 4100 is capable of supporting both synchronous and asynchronous terminals and handling a wide range of communications lines. With 16 asynchronous lines and one high-speed trunk, the 4100 costs $6,800. Next in line, the 4200, is a multi-microprocessor unit planned for early next year.

• CONSERVATION BUFFS TAKE NOTE: IBM is experimenting with a "remote power control station" in its San Jose 370 installation that allows an operator to switch electric power only to those devices in a computer system actually in use. Neat!

• THE FCC'S INTERCONNECTION PROGRAM HAS BEEN RE-CONNECTED by Virginia's Fourth Circuit Court of Appeals, which vacated its stay of the FCC order allowing sirect of customer-owned data and ancillary equipment (EDP/IR,April 30,1976). Makers of key telephones and PBXs, however, lost out -- the stay doesn't apply to them.

• GET A MICROCOMPUTER KIT FOR CHRISTMAS? Well, a device turning any selectric typewriter into an I/O unit is now available from Edityper Systems Corp. for $395.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JULY 22, 1976 • VOL.11,NO.24 P.J.McGOVERN,PUBLISHER

Keydata goes head-on vs. hardware -- page 6

LARGE CONTROL MEMORY, BETTER LEASE TERMS, PURCHASE PUSH MEAN NEW IBM INTERMEDIATE SYSTEMS WILL HAVE WIDE IMPACT

In a long-expected move, IBM ended the first half of 1976 by announcing its "intermediate systems for growth." Then, two weeks later, it posted "very satisfactory" first half results "characterized by a higher than forecasted volume of outright purchases." The big questions these actions posed for midsummer, Bicentennial thumbsucking were: What's the impact? What's the connection, if any? What's going on in the industry, anyway?

The two new mainframes -- labeled 370/138 and 370/148 -- may have affected as many portions of the computer industry as any IBM announcement of recent vintage. It was like a pebble tossed into a still pond, creating even disproportionately large waves in every direction:

- Other mainframe manufacturers were caught somewhat short as the reduced memory prices and improved performance of the 138 and 148 made IBM's new products look like the best medium-sized buy on a price basis -- a novel twist from a significant shift on the price charts.

- Independent memory suppliers, as a result, are left with less of a target: Not only is semiconductor memory on the two new systems set at the $170,000 per megabyte level established recently for purchases of other VS 370s (EDP/IR,May 28'76); it only comes in large blocks, half a megabyte for the 138 and one megabyte for the 148.

- Leasing companies are asked to reexamine their current positions in light of the new four-year term lease announced for the new products and extended to all virtual storage 370s plus such closely associated equipment as consoles and channels. It is a nine percent discount from rental; the prior term plan offered the same monthly price as rental but unlimited use.

- Users in the middle range have decisions to make. The CPU/memory combinations just announced give a ten-month faster payout than their predecessors; the purchase price of the new products is only 35 times rental, 39 times lease. But relative maintenance rates are doubled.

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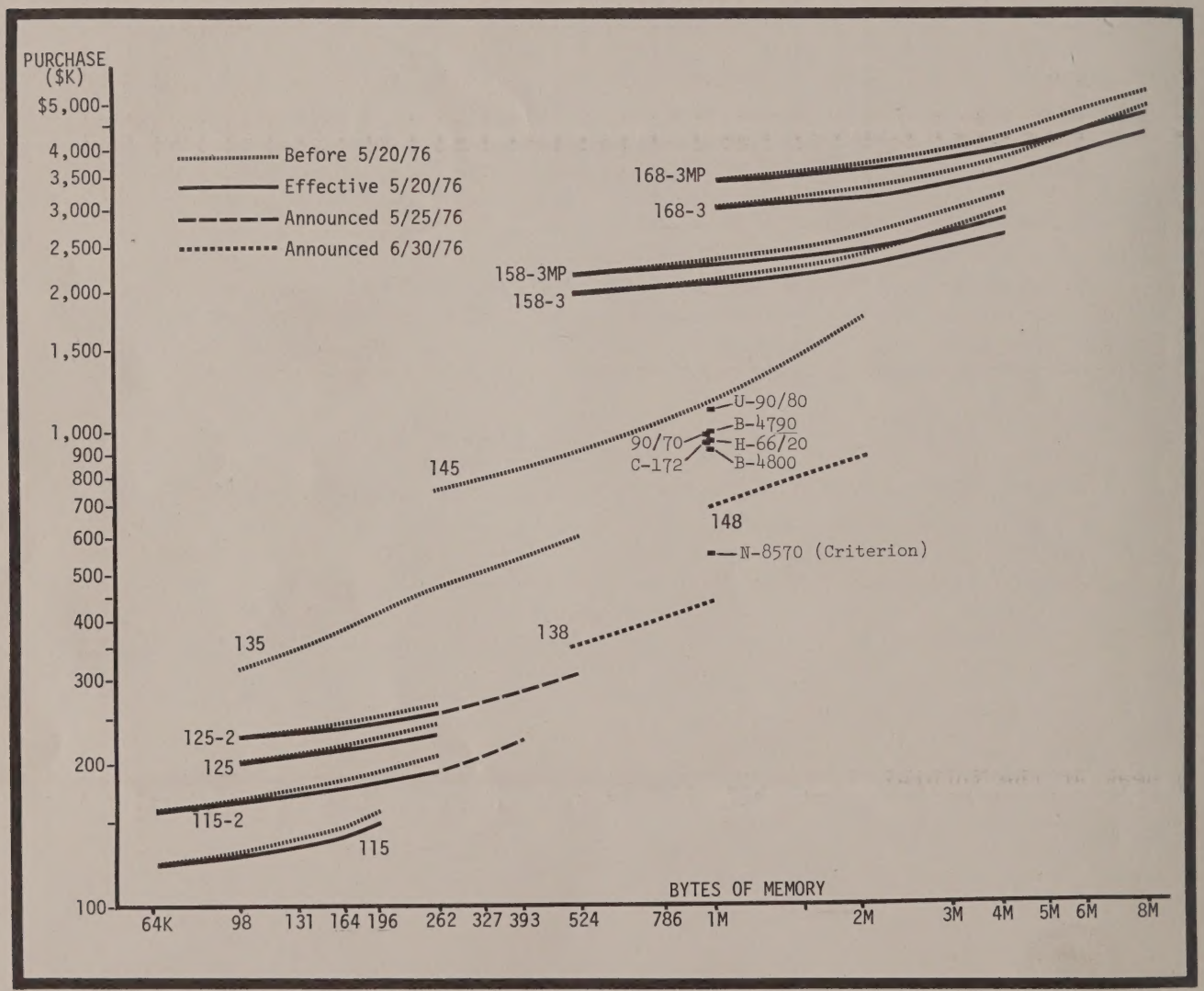
In addition to the marketplace impact summarized above, the 138 and 148 appear to be worth evaluating from the technological standpoint. Each CPU includes a 131K-byte reloadable control store in addition to its megabyte-sized main memory. Thus, IBM seems to be endorsing and preparing to take advantage of the virtual machine design concept. So even though IBM is offering to let Models 135 and 145 be upgraded to the new computers' internal performance (via the control store), the longevity of the new machines must be evaluated.

It will be yearend, at least, before users and competitors get inside one of the new CPUs. And until that occurs, it seems unlikely that much more will be understood about their design. It is reasonably assumed that their increased performance -- up to 36 percent faster for the 138 over the 135 and up to 43 percent for the 148, according to IBM -- is achieved via an expanded instruction set which is implemented in microcode. The machine's structure could be more significant.



LAST MONTH'S CEILING IS NOW A FLOOR in the intermediate-size mainframe arena (see chart of purchase prices, above). With its 138 and 148, IBM has given computer users a better price/performance buy while impacting other mainframers. Sample points show current one-megabyte entries from major mainframers. The larger of NCR's new Criterions (8570) now competes at the 138 level; Univac's newest 90/80, launched against the 145, is now priced higher than IBM's upgrade machine. All other mainframers have similar pricing dilemmas -- now above what they were below

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It certainly signals a further move in the virtual direction. At the very least, EDP/IR suspects the new 370/138 and 370/148 relate to the prior System/370 line as the 370/155 and 370/165 related to the System/360 line. Indeed, the reports from Japan -- where IBM's every move is watched like a hawk -- call the new products "stopgap versions of the IBM Future System . . . likely to sharpen competition among domestic and foreign computer makers."

Most speculation stems from the intended use of the large control store. In the announcement, IBM says:

> Each machine incorporates a reloadable control storage of 131,072 characters, five times the standard capacity of the Model 135 and four times the standard capacity of the Model 145. This portion of the processor stores programs that control the sequence of operations, as well as emulation and diagnostic routines.
>
> The large control storage also accommodates standard and optional features available with the Models 138 and 148, allowing users to expand easily their system configurations.

To EDP/IR, this implies the potential for much machine transparency. Thus, the new CPUs probably represent a bridge to future products, if not an actual member of any new family.

Priced to sell

One of the strong arguments against the 138 and 148 actually being part of a new IBM product line -- and simply an extension or late-life kicker for System/370 -- is the extremely short (for IBM) payout period for purchase versus monthly acquisition. This could and likely does argue for a short active marketing life for the 138 and 148.

On the other hand, the emphasis on term leases is one more example of IBM's continuing attempts to establish roadblocks against any massive migration to new equipment . . . whenever it is announced. And the more attractive purchase price could be further evidence that IBM is gradually moving toward a purchase-oriented business. This has been one element in IBM's apparent strategy during the last few years.

To address the 138/148 vs. FS question another way, EDP/IR will rephrase its often-expressed view that the concept of a new generation from IBM may be elusive. The 3850 is probably a part; all that is wrapped up in SNA/SDLC is a part; larger main memories and control stores are a part; high modularity is a part and implies that users will acquire equipment outright or for longer periods. Someday the industry may look around and discover that FS is here.

Details of the announcement

IBM, of course, described the recent announcement as "two new computers that bring improved performance and economy to the midrange of the System/370 family." The major emphasis in the general press release essentially summarizes the future:

> The new System/370s -- the Models 138 and 148 -- can enable users of intermediate-sized computers to design larger, more efficient interactive, data base and data communications applications.

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Some of the specific machine features or characteristics -- in addition to those discussed above -- are listed by IBM:

+ Performance -- For a "representative set of selected DOS/VS jobs" in batch, the 138 measured 1.18 to 1.38 times faster (in throughput) than the 135. Likewise, a 148 measured 1.03 to 1.47 times faster than a similarly configured 145.

+ Memory -- The new machines use the same MOSFET technology as other VS System/370s. The 138 comes with 524,288 or 1,048,576 characters (or bytes); the 148 is available with 1,048,576 or 2,097,152 characters.

+ Programming Support -- Extended control program support reduces the processor time needed to execute certain frequently used supervisor functions in OS/VS1 and VM/370. IBM says this reduces up to 55 percent the number of processor cycles required by supervisor operations for VM/370 and that it gives OS/VS1 users 13 to 18 percent savings in cycles with the 138 and 9 to 20 percent on the 148.

+ Console, Printers -- Both new systems have a 1,920-character display console and provide for the attachment of a printer to give hard copy of the console display. For production output, IBM announced a new model of its 3203 printer (rated at 1,200 lpm); the user may attach one or two of these via an integrated printer adapter. In addition, the 138 can use a larger 1403 printer via an IPA.

+ Features -- Many features that are options on the 135 and 145 have been made standard for the 138 and 148. These include APL assist, timer, extended precision floating point, and block multiplexer channels (two on the 138 and four on the 148).

Also, as mentioned earlier, the 135 and 145 can be upgraded to the new internal performance levels. But it is expensive. To begin with, the machine to be upgraded must have at least 262,144 characters of main memory. Then the prerequisite features must be added. Then, the user must pay $120,000 (or $3,500 a month) for the 135, $190,000 ($5,600 a month) for the 145. On the four-year lease, a half-megabyte 135 would cost $14,615 after conversion vs. $8,730 for the 138; a one-megabyte 145 is $27,430 vs. $17,280 for the 148 of similar memory size. It is expensive!

The revenue connection?

To EDP/IR and others at IDC, it seems that IBM is operating under a three-pronged strategy to keep revenues growing faster than the computer industry and to keep profits moving at a parallel pace:

(1) Substitute computer spending for some of the user's communications budget. SDLC is the key element in this effort.

(2) Substitute hardware spending for some of the user's software/programming budget by dumping memory on the problem, as one panelist at a recent technical session expressed it.

(3) Pepper the present with highly profitable revenue by encouraging sales rather than rentals.

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It is clear that the current announcement fits in with the above. So it seemed almost like the next page in the same story when IBM, two weeks after announcing the 138 and 148, released its six months' financial report, with comments:

Item	1st Half 1975	1st Half 1976	Change	% Change
Rental/Service Income	$4,846 B	$5,084 B	$ 238M	+ 4.9%
Income from Purchases	1,922	2,744	822	42.8
Total Revenue	$6,768 B	$7,828 B	$1,060M	+15.7%
Total Profit	$ 906 M	$1,137 M	$ 231M	+25.5%

> Operating results . . . continued at a very satisfactory level. The second quarter was characterized by a higher than forecasted volume of outright purchases of data processing equipment, with volumes substantially greater than the comparable period of last year. As previously pointed out . . . outright purchases result in the immediate realization of income while income from rental transactions is realized over a period of years.

In reporting the results, however, IBM's Chairman, Frank T. Cary, did not caution stockholders that the rental income was more indicative of the company's future nor did he caution that the trend wouldn't continue. He did report that "incoming orders for data processing equipment are continuing at a strong pace."

So is there a connection? An equally valid subject to explore would be who actually is calling the shots about the rental/lease/purchase decision when EDP equipment is accepted for delivery. Is it the customer? Or the supplier? The answer, of course, is some of both.

The computer user today -- at least the sophisticated user at the large organizations that account for the bulk of data processing spending -- has a fairly clear idea of what his needs will be for the next few years. Communications systems and the organization for a data base management operation take time to plan . . . and are not easily or quickly changed.

Yet mainframe manufacturers have ways -- the way salesmen are compensated, for example -- of exerting influence on the user and how he acquires equipment. IDC surveys illustrate the situation: Most users think they are acting independently, and list their reasons; but when these are categorized and examined, they read like a litany of a manufacturer's apparent policy.

The biggest question users must face today is whether or not they expect to use equipment for its full economic lifetime. Despite any promises or understaning at the time the equipment is ordered, an interesting phenomenon is possible. The more purchases the users make, the less a mainframer is dependent on rental flow (existing product line) for revenue. Therefore, it becomes easier for the manufacturer to introduce equipment that offers substantially better performance and therefore encourages the user to abandon his purchases equipment and rent the new and more productive equipment . . . so long as it is compatible.

Purchase base implications

The above is theory. But it represents a strategy that IBM, at least, could be following. This is particularly true since almost any new product would have to be compatible with what is past . . . even to the extent to being called by the same name. It certainly begins to look feasible in the U.S. where, at the end of

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1975, only 40% of IBM's total installed base -- and, most important, only 42% of the 370 base -- was owned by the mainframer and bringing in rental dollars.

Indeed, the obvious purchase push represented by the 138 and 148 must very carefully be considered. At yearend 1975, the 135 and 145 mainframes on rental represented almost half the value of all 370s on rental. Looked at another way, the 135s and 145s on rent were valued at 1.67 times the value of all the larger 370s -- the 155, 158, 165, and 168 -- that remain on rent.

Many of the peripherals with these systems -- especially the disk drives -- tend to be leased rather than purchased . . . but no matter. It would seem that IBM is certainly not trying to stop the purchase of newer systems as it did late in the life cycle of the 360 by introducing the 360/25 with a payout period longer than was standard at the time.

So it seems fairly clear that IBM wants users to purchase its new equipment. Otherwise, the pricing would be different. One possibility is that IBM wants to shift the computer industry toward the capital goods business with product changes on a regular basis. Another theory talks about radical new products or transaction pricing. Clearly, the 138 and 148 raise questions . . . to be evaluated.

\+ + + + +

KEYDATA OFFERS FIXED-PRICE SERVICE TO SMALL FIRMS IN HEAD-ON COMPETITION WITH SYSTEM/32 AND MINIS

The setting was perhaps as grand, but certainly on a less grandiose scale. Six years (almost) ago, L.E. Donegan, Jr. -- ex-IBMer, former executive with Service Bureau Corp., top-level recruit to revitalize RCA's computer operations -- had been one of the major players in the show that announced RCA's new product line and "committed whatever resources are necessary" for the company to make it in computers. A boardroom decision changed all that, of course, in 1971.

This midyear, Donegan was back in Boston, at a smaller but better restaurant, explaining to a smaller group of press representatives how his present company -- Keydata -- could take advantage of the exploding market for computer power at small business operations:

> We believe that most businessmen would rather devote their time to running their businesses than to worrying about the success or failure of a computer operation. For this reason we've designed our new product to provide them with a low cost, risk-free alternative to the minicomputer.

Designed to appeal to small distribution and manufacturing companies in the $750,000 to $5 million annual sales category, the new Keydata service is called the System 800 because it offers the smaller companies specific data processing applications -- billing, inventory control, accounts receivable, sales analysis -- plus monthly and quarterly management reports, for a packaged price of $800 per month.

The system is based on a unit of measurement called a KRU (Keydata Resource Unit) that is a flexible combination of four factors including number of invoices, average number of invoice lines, number of customer records, and number of item records. The basic package includes:

- One split-platten terminal operating at 15 characters a second (or one twice as fast as an option) and full maintenance;

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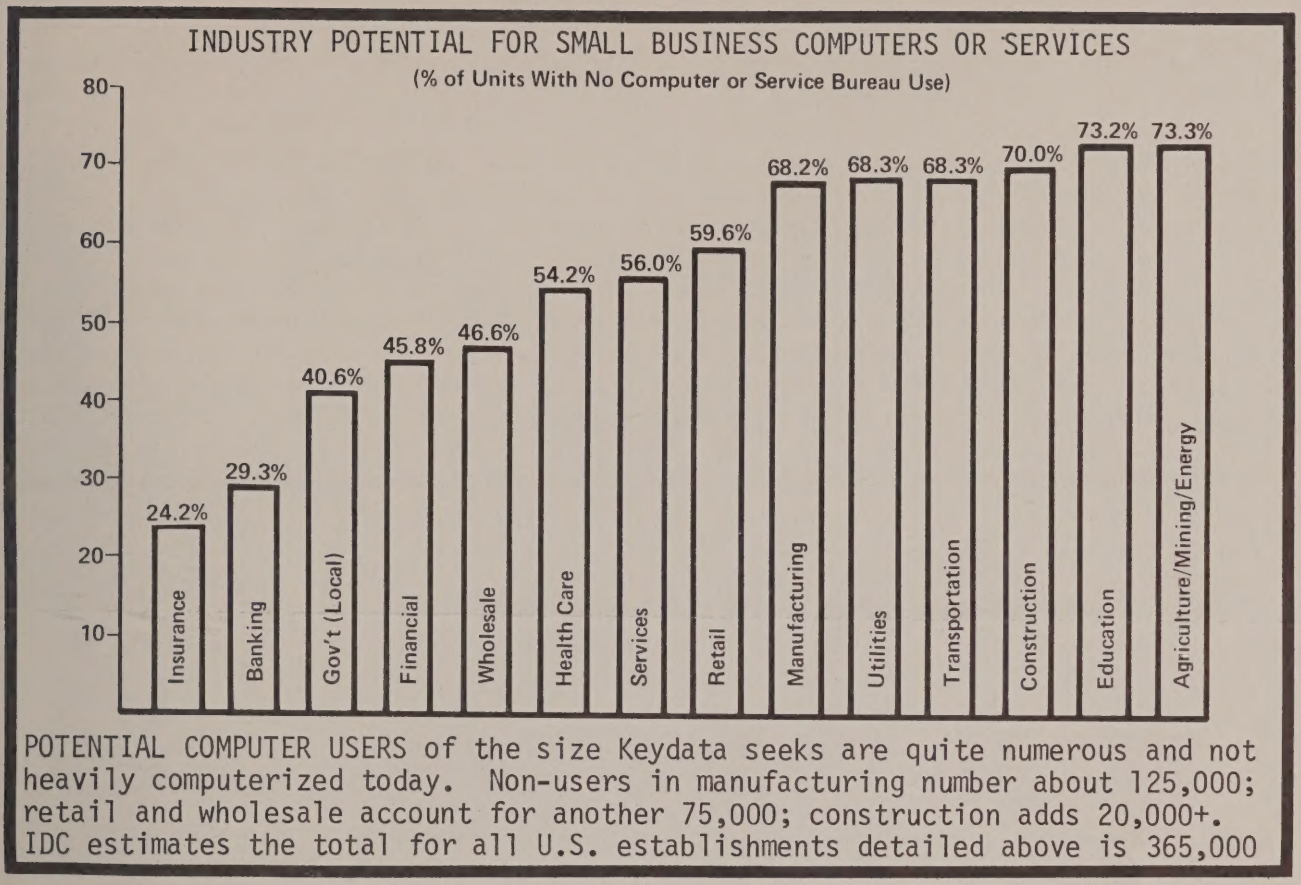

POTENTIAL COMPUTER USERS of the size Keydata seeks are quite numerous and not heavily computerized today. Non-users in manufacturing number about 125,000; retail and wholesale account for another 75,000; construction adds 20,000+. IDC estimates the total for all U.S. establishments detailed above is 365,000

- Performance of billing, inventory control, accounts receivable, and sales analysis on line with two-second response. Up to 175,000 KRUs a month are included, and additional work is charged at $4.75/1,000.

- On-line access to Keydata's central computers near Boston for 14 hours a day, five days a week plus 10 hours on Saturday.

- Access to the Keydata computers via the company's nationwide data communications network.

- The ability to connect up to three locations to a central data base.

A peak at the future?

For some time, now, it has appeared to EDP/IR that the small business user represented a testing ground for ideas that are still to come in the more traditional portions of the data processing environment. This user is generally less sophisticated, so the offering must be more solution oriented. Probably for this very reason, we see true competition -- as Keydata's offering illustrates -- developing between services and hardware suppliers. Additionally, we see the minicomputer suppliers looking for partners who are industry specialists.

Looking to this testing ground for snapshots of the future, then, we wonder if the Keydata approach is indicative? We can't help thinking, from time to time, that IBM can re-enter the service business in a few short years . . . that SBS will be there . . . and that transaction pricing is talked about as a future IBM strategy. And we can't forget Donegan's background. So we'll be watching.

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• HONEYWELL BULL BECAME A FRENCH COMPANY AGAIN at midyear with the completion of the Bull/CII merger agreement signed at yearend 1975. HIS, Honeywell's computer subsidiary, receives approximately $250 million for reducing its share in Bull from 66 per cent to 47 per cent. The merged company -- which will employ 19,000 persons, including 5,000 transferred to Bull from CII for marketing -- expects subsidies from the French government of approximately $250 million from 1976 through 1980 to offset transition costs of the merger.

The new Compagnie Honeywell Bull (CHB) will be 53% owned by Compagnie Machines Bull (CMB). This company, in turn, is owned 65% by some 50,000 stockholders with the principal remainder of the French holdings divided about equally between Compagnie Generale d'Electricite and an agency of the French government.

• PHANTOM JUDGE FOR FIGHTING MACHINES seems to be the situation shaping up in New York City for the summer. This week the Department of Justice began its so-called "fighting machine" portion of the case (IBM prefers to call it the "product announcement" aspect of the antitrust suit) that involves 500 documents but only one live witness. Judge Edlestein has begun a schedule of having the government begin reading depositions . . . and then retiring to his chambers where he "is available" until he returns at 4:30 to close the day's session.

• EXPANDING ITS FAMILY OF 16-BIT MINIPRODUCTS, Interdata has new entries for the low and middle range of its "compatible product family." Priced at $868 in quantities of 100, the 5/16 is housed on a single board, can have up to 48KB of read-only memory. Interdata says it is compatible with the company's entire range of processors, provides "twice the performance" of a comparable LSI-11 from DEC. At the top of its 16-bit family, Interdata has introduced the 8/16 which it says compares favorably to the DEC 11/35 and the DG Nova 3. A basic 32K model sells for $4,160 in quantities of 50; a fairly fleshed out version is priced at $16,761 in quantities of 10, Interdata says. Both are available by year's end.

• EXACTLY ON SCHEDULE, THE ANGLO-FRENCH PARTNERSHIP of Logica and SESA started up the European Informatics Network with communications between five computer network centers at Milan, Zurich, Paris, London, and Ispra (in Northern Italy). The centers now start a practical phase, first testing the connection of their computers to the communications system, then developing software protocols "in successive layers of increasing sophistication and power." European PTTs have adopted the technology of EIN for Euronet, which is to be a prototype European information retrieval and documentation network.

• TIMESHARING PLUS CASH MANAGEMENT SERVICES can give corporate treasurers more control, says National Data Corp. in offering its customers timesharing services over the Comshare network. Data collected over the NDC network can be transferred to the timesharing net where the client's terminal can access it immediately for producing timely consolidated deposit balance and customized management reports.

• BOTH BELL AND A SPECIALIZED CARRIER have come up with new twists that could increase the user's communications flexibility. Southern Pacific Communications plans a switched private line telephone service, called Sprint, that will allow small and medium-size commercial users service they couldn't afford previously. For its part, the Bell System is testing Time Assignment Speech Interpolation, or TASI, which is a digital version of circuit-sharing pioneered in undersea calls. In essence, data will flow during pauses in conversations.

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